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SIEMENS

Protocol Tester K1197®
Dual Interface

User Manual

Version June 1993

C73000–G6076–C112

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For every error report we need the following information to find a solution as soon as possible:

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- detailed description of the error,
- list of commands typed in before the error occured,
- hardcopy of the screen when the error occured,
- hardcopy of the return stack backtrace, if it occured (press RETURN after command line window becomes red background),
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- data recording file, if the error occured in the monitor.

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Soft– and Hardware used for test:

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Version: _____ Serial–No.: _____

System+ Menu: _____

Options: ☐ Hard Disk ☐ RAM Extention ☐ other: _____

Tester Configuration:

☐ K1197 for monotoring

☐ K1197 for emulation/simulation as ☐ DCE / NT ☐ DTE / TE

Test environment: ☐ to another K1197

☐ other (Network, FAX Machine, etc.): _____

_____

_____

Error Description:

The error occurs: ☐ always ☐ sometimes

Encloses:

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Dual Interface
B–Channel Application
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UNIVERSAL SIMULATOR MONITOR

User Manual for Protocol Tester K1197

SIEMENS AG

Software Version	:	V3.1
System Version	:	MF 2.2
Revision Date	:	October, 1991

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1 GENERAL

1.1 INTRODUCTION

This Universal Simulator/Monitor User Manual for Protocol Tester K1197 describes the setup procedure and functionality of the USM software package. It includes the Manual for, USM Monitor/ Simulation (Section 2) and Test Manager (Section 3).

The Monitor/Simulator is intended to be used for testing data communication links that use BOP, COP, EBCDIC BISYNC, ASYNC BISYNC and Asynchronous procedures.

The Monitor/Simulator has two modes, simulator and monitor. In simulator mode, the Test Manager/Monitor can transmit data acting as DTE or DCE. In monitor mode, nothing can be transmitted.

Monitor

The MULTIFORTH USM Monitor is designed to run on SIEMENS K1197 MULTIFORTH System Version MF2.2.

The Universal/MONITOR/SIMULATOR can monitor live data and control lead changes which may be reported in several formats on a display screen or printout. This information may be stored in capture ram or recorded on floppy disk or Winchester if installed, and can be later retrieved to display or print out. Triggers and filters are also available for taking actions on selected events and displaying or storing only the selected data. Users can also create their own scenarios for collecting statistics or analyzing protocol procedures by using the Test Manager.
A Fast Mode allows disk recording up to several thousand frames per second.

Simulation

The MULTIFORTH Simulation software package is designed to run on SIEMENS K1197 MULTIFORTH system version MF 2.2. In addition, the simulation allows the user to control the protocol operation by entering commands or using Test Manager scenarios as explained in the later sections. This enables also the creation of invalid or unexpected protocol operation as required for testing.

1.2 PHYSICAL CONFIGURATION

1.2.1 MONITOR

The USM Monitor software package provides a tool for monitoring a communication line. The SIEMENS K1197 machine is non-intrusively connected to the communication line by using its interface connector module (ICM) at the back, as shown in Figure 1-1.

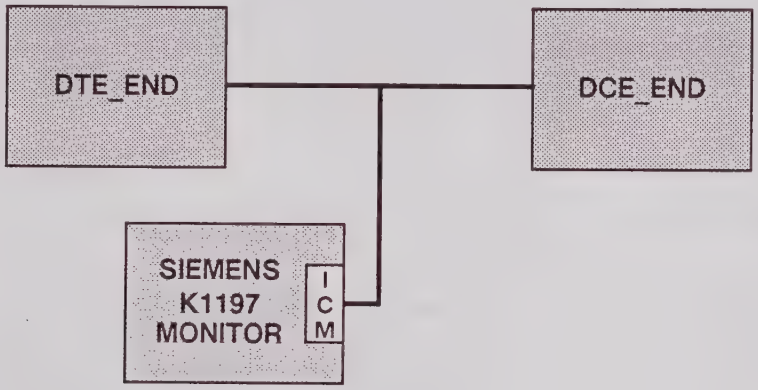


Figure 1-1: Schematic connection of K1197 for monitoring

Note: If mains is switched off, the K1197 shows a low input impedance on ICM connectors.

If the USM Monitor software package is running on a K1197 with S0/S2M Interface it is necessary to run also the D-channel application (ISDN Layer3 Monitor), as shown in Figure 1-2.

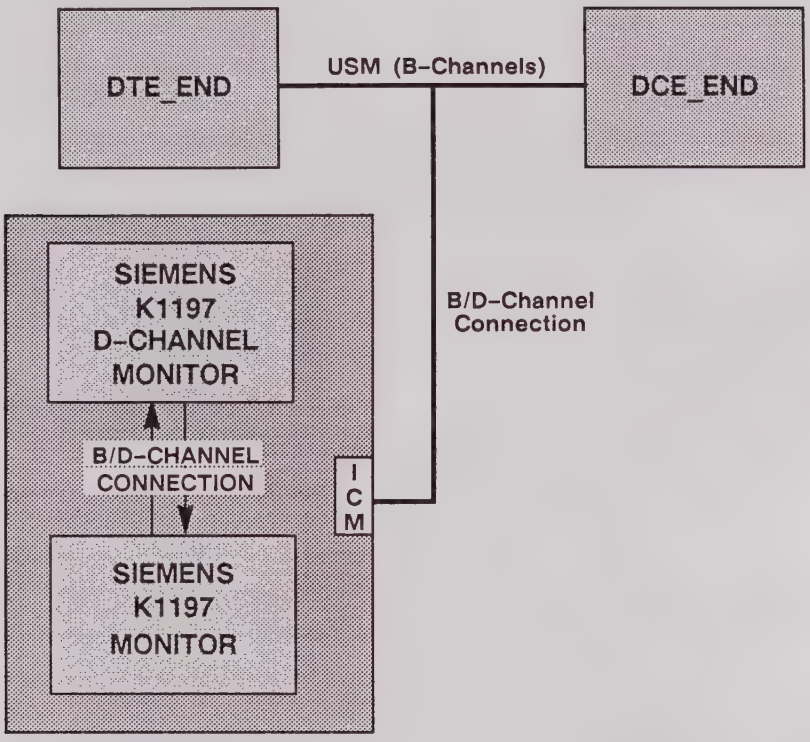


Figure 1-2: Schematic connection of K1197 for monitoring

1.2.2 SIMULATION

The USM Simulation software package provides a tool for testing a DCE or DTE (Terminal). The Implementation Under Test (IUT) can be directly connected to the SIEMENS K1197 machine using the Interface Connector Module (ICM) at the back of the machine, as shown in Figure 1-3:

Figure 1-3: Schematic connection of K1197 for simulation

To use the USM Simulation software package on a K1197 with S0/S2M Interface it is neccessary to run also the D-channel application (ISDN Layer3 Simulation) as shown in Figure 1-4.

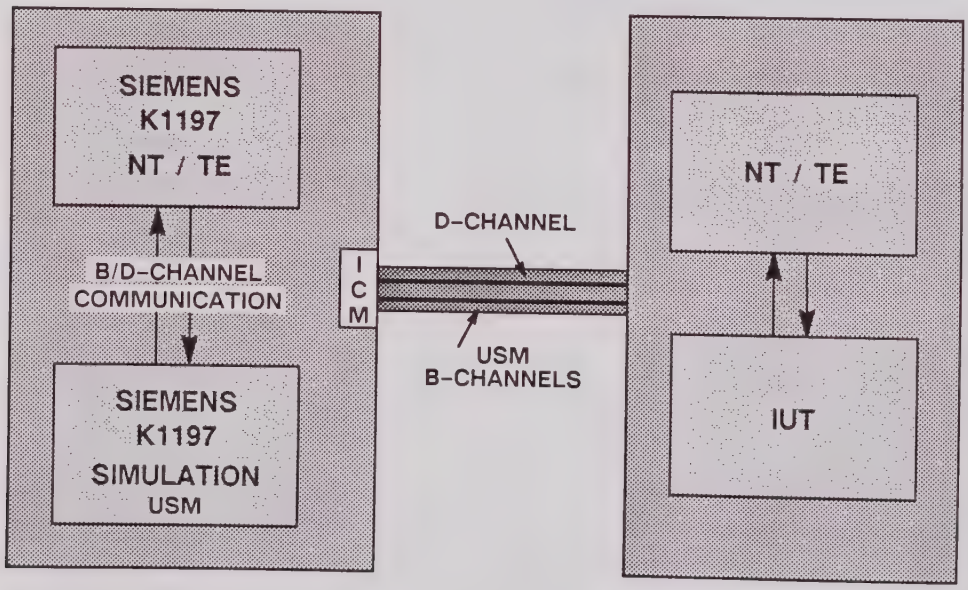


Figure 1-4: Schematic connection of K1197 for simulation

1.3 SET-UP

1.3.1 SET-UP PROCEDURE

Step 1 Make sure that the appropriate interface connector is attached for the hardware in the K1197.

Step 2 If the boot-process can not be completed correctly, the systemdisk "1" and "2" should be simultaneously inserted in Floppy-Diskdrives Ø and 1.

Step 3 Wait until the K1197 Power-up Menu appears on the screen. This shows the characters **'SIEMENS'** in very large letters on the screen.

Step 4 Place the USM software package diskette in either drive and select (USM) to load the software package.

Step 5 With Sø or S2M interface follow the directions for 'SET UP' in the K1197 ISDN User Manual and load the ISDN software (for USM Simulation use ISDN Layer 3 Simulation and for USM Monitor use ISDN Layer 3 Monitor).

Step 6 Connect the K1197 to the equipment under test using the cables and connectors.

1.3.2 CHANGING DEFAULT START-UP CONFIGURATION

The user can create a special USM setup file which will start-up the Application in a frequently used configuration. To do this, the user can set the USM Application in the required configuration and save this configuration in a file " USM_SETUP.1..4". This file will be loaded by entering the application. (See SETUP menu of the USM application in chapter 2.2.9.2 of this manual for more information.)

1.3.3 DISPLAY LEGEND

The general screen layout shown in figure 2 is applicable to USM Application.

Note that the USM Application screen layout is based on the Protocol Tester screen layout as shown in the K1197 User Manual. The special functions defined there are also applicable to the USM Application.

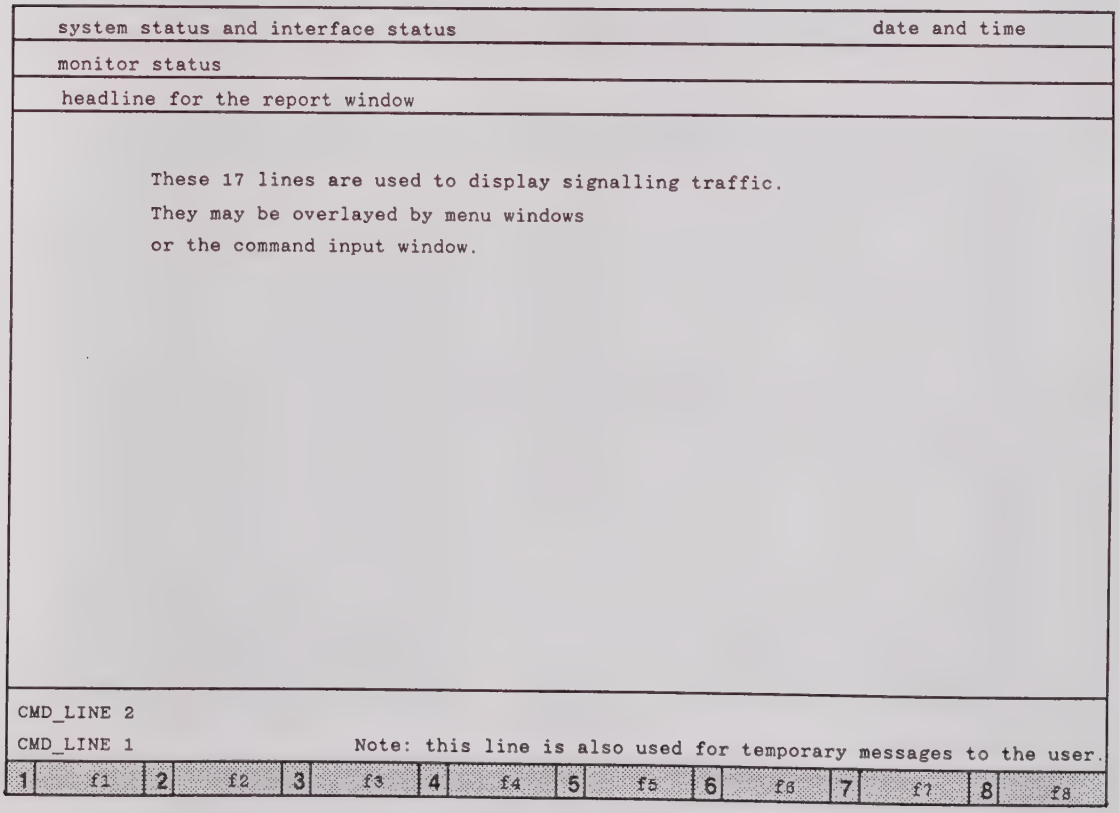

system status and interface status
date and time
monitor status
headline for the report window
These 17 lines are used to display signalling traffic.
They may be overlayed by menu windows
or the command input window.
CMD_LINE 2
CMD_LINE 1
Note: this line is also used for temporary messages to the user.
1 f1 2 f2 3 f3 4 f4 5 f5 6 f6 7 f7 8 f8

Figure 1-5: K1197 - Screen layout

Line 1-3 Status lines - provide setup and configuration information
Line 4-20 General Data and menu window display area
Line 4-22 Command input lines (by defailt only the last two lines are visible)
Line 22 Message line
Line 23 function keys (**f1 - f8**)

The first three lines are Status lines which provide setup and configuration information for the user. Application specific information such as column labels for the Monitor are shown on line 3. General Data and Menus can be displayed in the next seventeen lines. The next two lines are the last two lines of the command window. If the user chooses to enter Forth commands instead of, or in addition to, using the function keys, the keyboard entry and the system responses appear in this window. The final line is used to display the current function key assignments.

1.3.4 SPECIAL FUNCTIONS

There are two special function key combinations that are accessible at any time.

Returns the system to the FORTH interpreter in case of a lock-up or program error.

Prints a hardcopy of the current screen display. The printer configuration is defaulted for 1200 baud, 8 bits/character, ASCII, DTR and XON/OFF control, LF + CR end of line (EOL), 80 characters/line, 60 lines/page.

These parameters may be changed in MAIN Menu with the command **PRINTER_C**.

1.3.5 SWITCHING FROM ONE APPLICATION TO ANOTHER

Switching from one appication to another, that is to change the display and the key board control to another application program, can be done by pressing the key **ESC**. It toggles the control between application programs and the main utility functions (wrap around).

1.4 LOCAL/REMOTE CONTROL

It is possible to control the USM Monitor software package locally with the provided keyboard or remotely using other terminals. Since the local and remote control procedures are handled independently, both methods of control can be applied simultaneously.

1.4.1 LOCAL CONTROL

Local control of K1197 applications can be done using the keyboard. This keyboard provides a full ASCII keypad, eight function keys, and four cursor keys.

The ASCII entries are processed when the return key is entered. Entry will be processed by the FORTH interpreter to determine what commands are to be executed.

Function key entry is prompted by the function menus displayed on the bottom three lines of the screen. The line is the direct function key entry.

The cursor keys are used to scroll through the data when playing back from disk or capture ram. They are also used for entry selection when screen menus are being displayed.

1.4.2 REMOTE CONTROL

Remote control of K1197 applications can be done using the MODEM connector on the auxiliary interface module on the back panel of the K1197.

The remote control line is configured to use async, ASCII, 8 bits, no parity, and 1200 baud. The K1197 does not echo received characters. If local display is wanted on a terminal, the terminal should be set to Half Duplex.

Commands on the remote control line are to be entered followed by a carriage return character. The program will process the input, and send the command line display to the remote site followed by the prompt "ROK" and the carriage return and linefeed characters. The programs will process the remote commands the same way as if they had been entered on the local keyboard.

Refer to the Remote Control section of the K1197 User Manual [1] for more information on special remote control commands.

2 MONITOR

2.1 MONITOR STATES

The monitoring program is always in one of three states:

1. HALT *(playback mode, data retrieved from Capture RAM or Diskette),*
2. FREEZE *(data retrieved from Capture RAM, direct data may be recorded) to Diskette),*
3. MONITOR *(data arrives directly from the interface)*

Following initial set-up, the Monitor is in the HALT state. These states can be changed by the f4, f5, f6 function keys or by the commands HALT, FREEZE, or MONITOR and PLAYBACK.

2.1.1 HALT STATE

All processing of live data is halted. Scrolling and display can be done from capture ram or from disk playback.

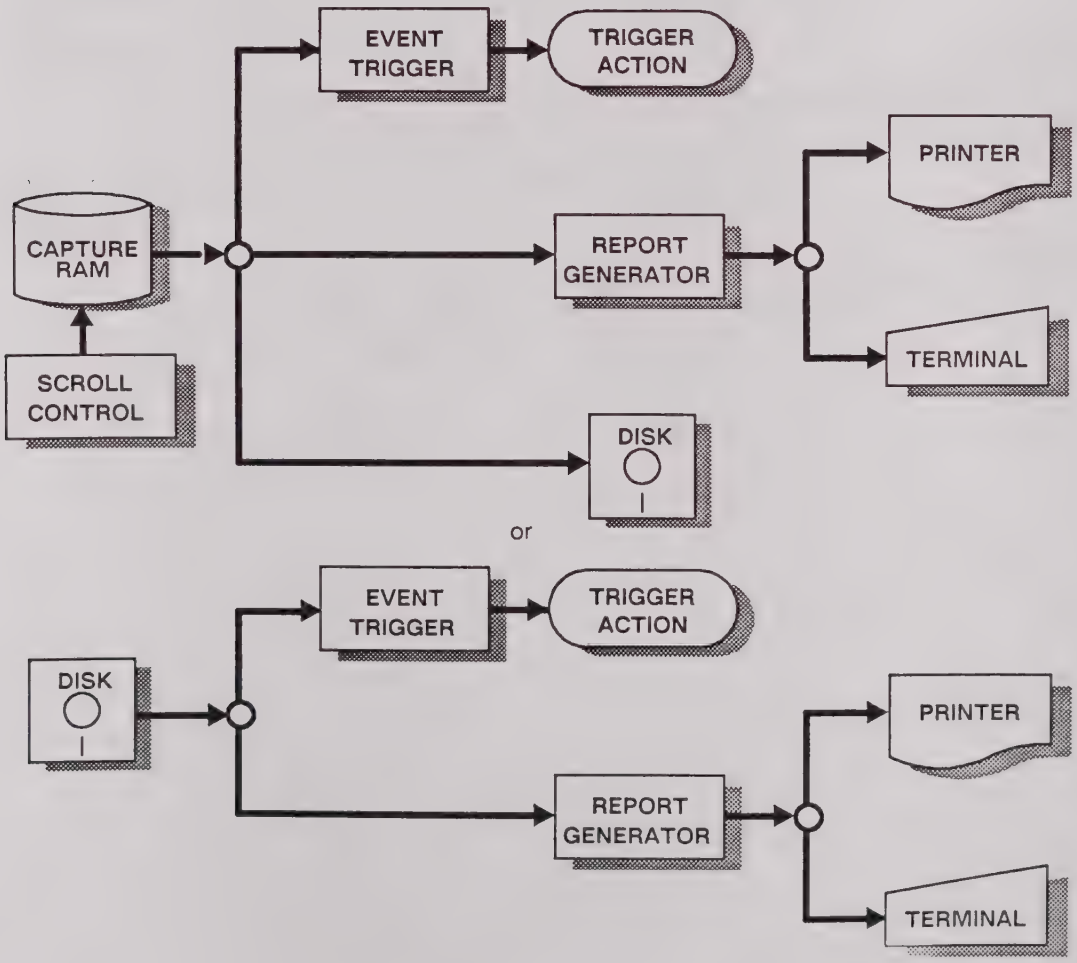


Figure 2-1: Data form Capture Ram

2.1.2 FREEZE STATE

Live data is not written to capture RAM or sent to the report generator. However, live data can still be recorded on disk. The contents of the capture RAM can be reviewed on the display. Event triggers on the live data can be active.

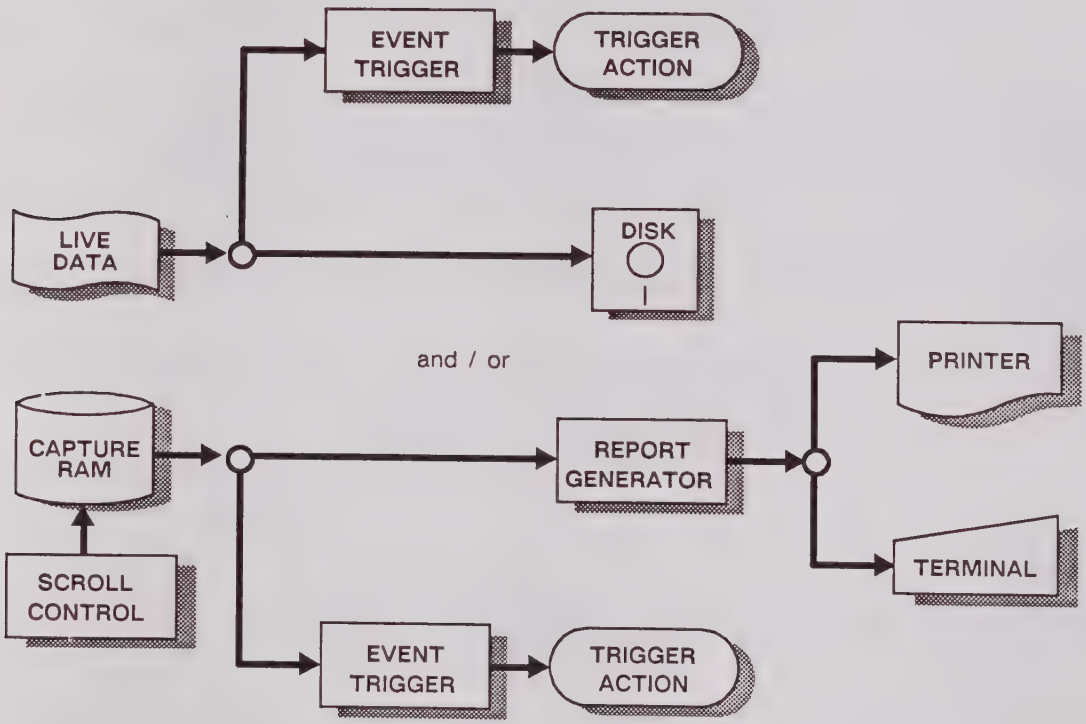


Figure 2-2: Data Flow in the Freeze Mode

2.1.3 MONITOR STATE

Live data is displayed on the screen and can optioanlly be recorded to disk and/or stored in capture RAM.

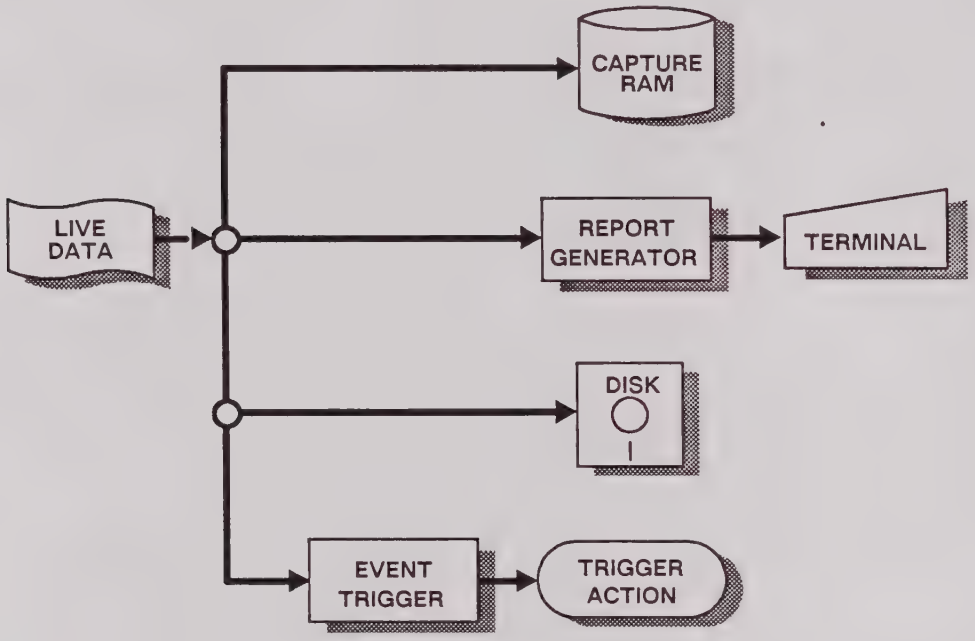


Figure 2-3: Data Flow in the Monitor Mode

2.2 MENU SYSTEM

The menu system provides an intuitive interface designed to minimize the need to refer to the manual. It includes pop-up help screens to remind the user of meanings of selections available in the menus.

2.2.1 MOVING AND SELECTING ITEMS

Within a menu, the following keys may be used to move and perform actions:

Cursor up (↑)	Move to next selectable item above this one.
Cursor down (↓)	Move to next selectable item below this one.
Cursor left (←)	Move to previous menu to the left without entering current item. Note: Some menus do not allow this key in order to force the user to select some action through a function key before leaving the menu (e.g: the Hex editor and Message Building System). String and numeric entry fields: Move cursor one character backward.
Cursor right (→)	Move to next menu to the right if one exists. String and numeric entry fields: Move cursor one character forward (first key struck enables editing the already displayed string, which is indicated by a little blinking cursor).
Control cursor up (ctrl-↑)	Move up one page on scrolling menus.
Control cursor down (ctrl-↓)	Move down one page on scrolling menus.
Control shift cursor up (ctrl-shift-↑)	Move to first item in menu.
Control shift cursor down (ctrl-shift-↓)	Move to last item in menu.
Control shift cursor left (ctrl-shift-←)	Close all opened menu windows except the first one.
Control shift cursor right (ctrl-shift-→)	Open all those menu windows which were closed by ctrl-shift-← or a series of cursor left actions.
Shift cursor right (shift-→)	String and numeric entry fields: Shift the characters from this place on one step forward and create an empty place (blank) between the already existing characters.
Shift cursor left (shift-←)	String and numeric entry fields: Delete the character under the cursor and shift the following characters one step backward.
Control cursor right (ctrl-→)	String and numeric entry fields: Move the blinking cursor to the last character in the string.
Control cursor left (ctrl-←)	String and numeric entry fields: Move the blinking cursor to the first character in the string.
Home	Move to first item in menu (same as ctrl-shift-↑).

Return	Select an item, complete entry of a typed value or execute a command.
Back Space (BS), Delete (DEL)	String and numeric entry fields: Erase the character before the cursor.
Space bar	When the cursor is on a field which takes a number of options, the space bar may be used to scroll through the available options. These options may also be accessed by typing cursor right and selecting the desired option by pressing **Return**.
Number and character keys	Search a string from the list of selectable items. Every key struck moves the cursor forward onto the next item to which the string matches. String and numeric entry fields: Erase the old entry and create a new one. If cursor right, ctrl–→, shft–→ or shft–← was pressed first, edit the already existing string.

2.2.2 MENU ICONS

The menus use a number of icons to convey information about the options available on the menu. The borders of the menu are of two types: single line and double line. Double line borders are used to indicate the last menu in a chain. There will not be any menus to the right of a double bordered menu.

At the top and bottom of the right border of a menu there will apear arrows if the menu is bigger than what will fit in the window. The arrow indicates that there are more items outside the window in the direction indicated.

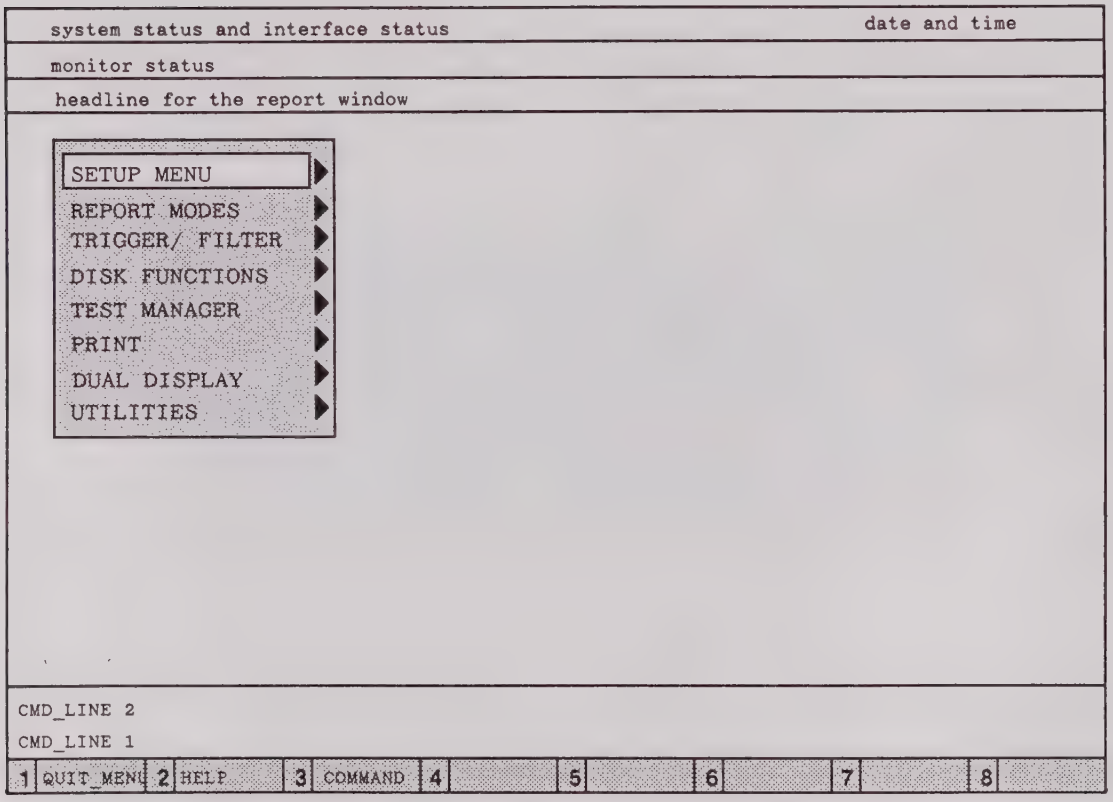
At the right of a selectable item, one of the following may appear: ▶ or ≫. The single solid arrow indicates that there is a menu to the right of this item that will be displayed when cursor right is typed. The double arrow indicates that the field takes a number of options which may be scrolled through with the space bar or listed using the cursor right key.

2.2.3 FUNCTION KEYS

A set of function keys on the bottom line of the display is almost always availble. Some common keys are listed here.

MENU / QUIT_MENU	: Enter to menu system control. / Leaves the menu system control.
HELP / QUIT_HELP	: Open a help menu for the particular menu window.
COMMAND / QUIT_COM	: Give the control to the FORTH interpreter which enables the use of keyboard for typing commands. The menu system window remains still visible. Return the control back to the menu system.
HALT	: Switch to HALT mode
FREEZE	: Switch to FREEZE mode
MONITOR	: Switch to MONITOR mode
TM_KEYS / MON_KEYS	: Switch to Test manager control keys / back to monitor control keys

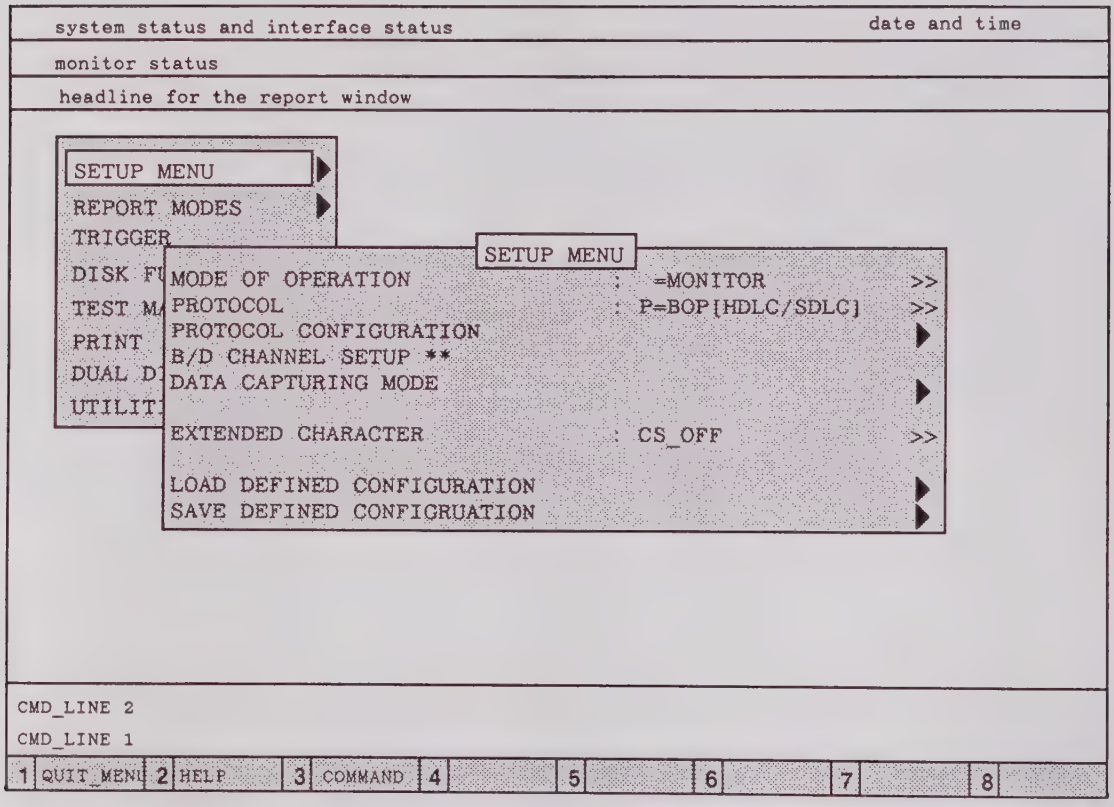
2.2.4 MAIN MENU



MENU SELECTION:

SETUP MENU	: Goto SETUP MENU for analyzer
REPORT MODES	: Goto REPORT function menu
TRIGGER/ FILTER	: Goto TRIGGER/ FILTER function menu
DISK FUNCTIONS	: Goto DISK function menu
TEST MANAGER	: Goto TEST MANAGER function menu
PRINT	: Goto PRINT function menu
DUAL DISPLAY	: Goto DUAL DISPLAY function menu
UTILITIES	: Goto UTILITIES function menu

2.2.5 CONFIGURATION MENU



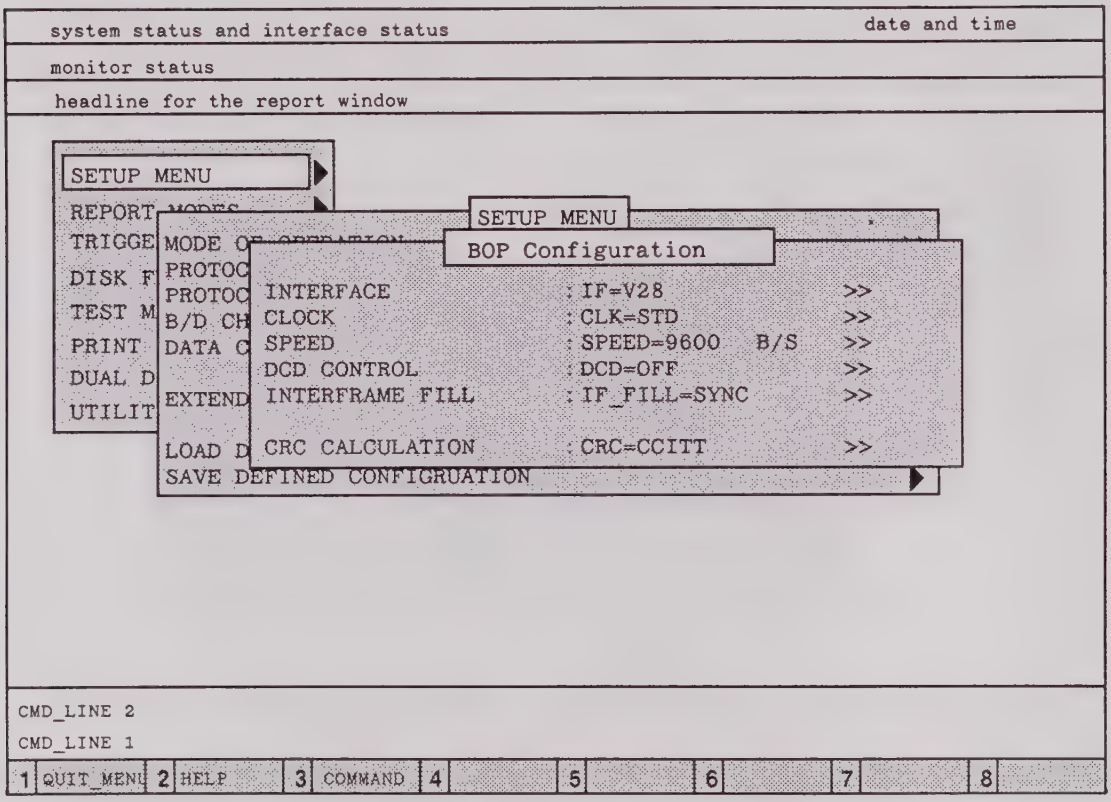
MENU SELECTION:

MODE OF OPERATION	: Select MONITOR, Simulate DCE, Simulate DTE
PROTOCOL	: Select BOP (Bit oriented procedure), COP (Character oriented procedure), EBCDIC BISYNC (BSC), ASCII BISYNC (BSC), ASYNC.
PROTOCOL CONFIGURATION	: Enter configuration MENU for selected Protocol Mode
B/D CHANNEL SETUP	: Enter menu to select ** B-Channel
DATA CAPTURING MODE	: Enter menu for capture RAM setup
EXTENDED CHARACTER	: Select character set for menu display
LOAD DEFINED CONFIGURATION	: Enter menu to load a setup file.
SAVED DEFINED CONFIGAURATION	:Enter menu to save a setup file

* Only available with V/X interface

** Only available with S0/S2M

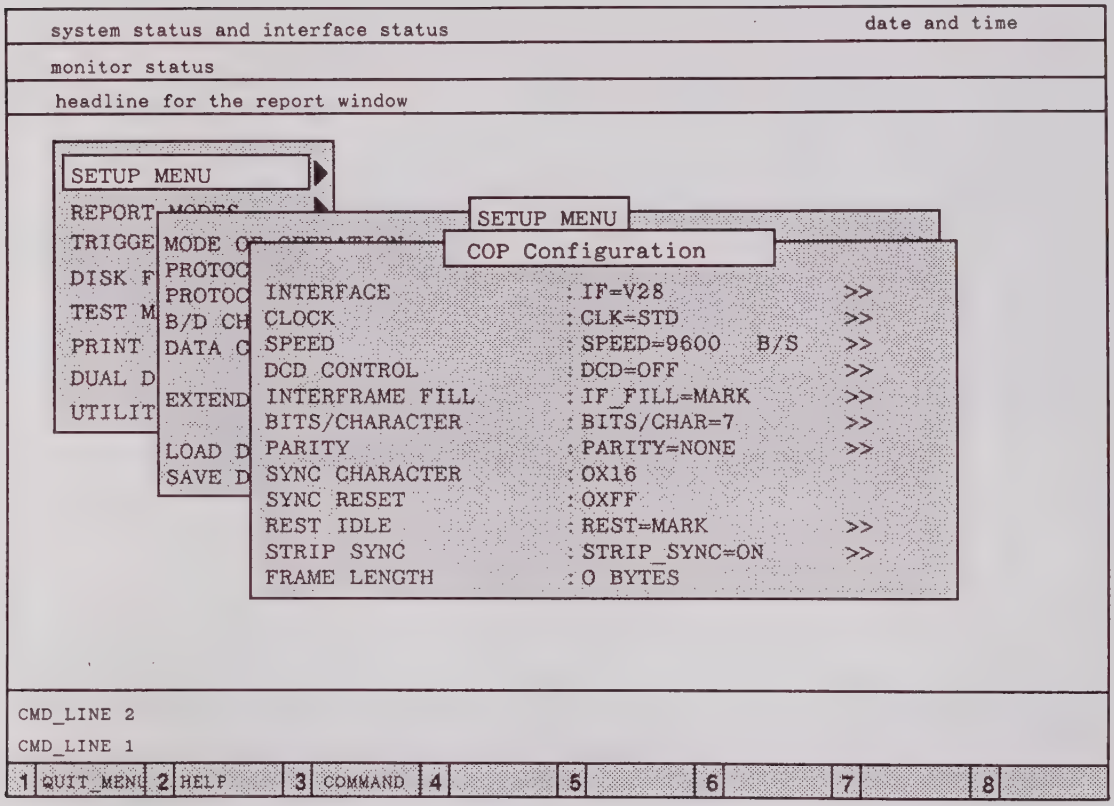
2.2.6 BOP(Bit oriented procedure) CONFIGURATION MENU



MENU SELECTION:	
INTERFACE	: Select interface type (V11, V28, V35, V36) *
CLOCK	: Select clock Standard, External, NRZI, NRZIC.
SPEED	: Select interface speed
DCD CONTROL	: Set Data Carrier Detect ON/OFF
INTERFRAME FILL	: Set interframe fill to SPACE, MARK SYNC
CRC CALCULATION	: Select CRC CCITT, CRC16, VRC/LRC.

* Only available with V/X interface

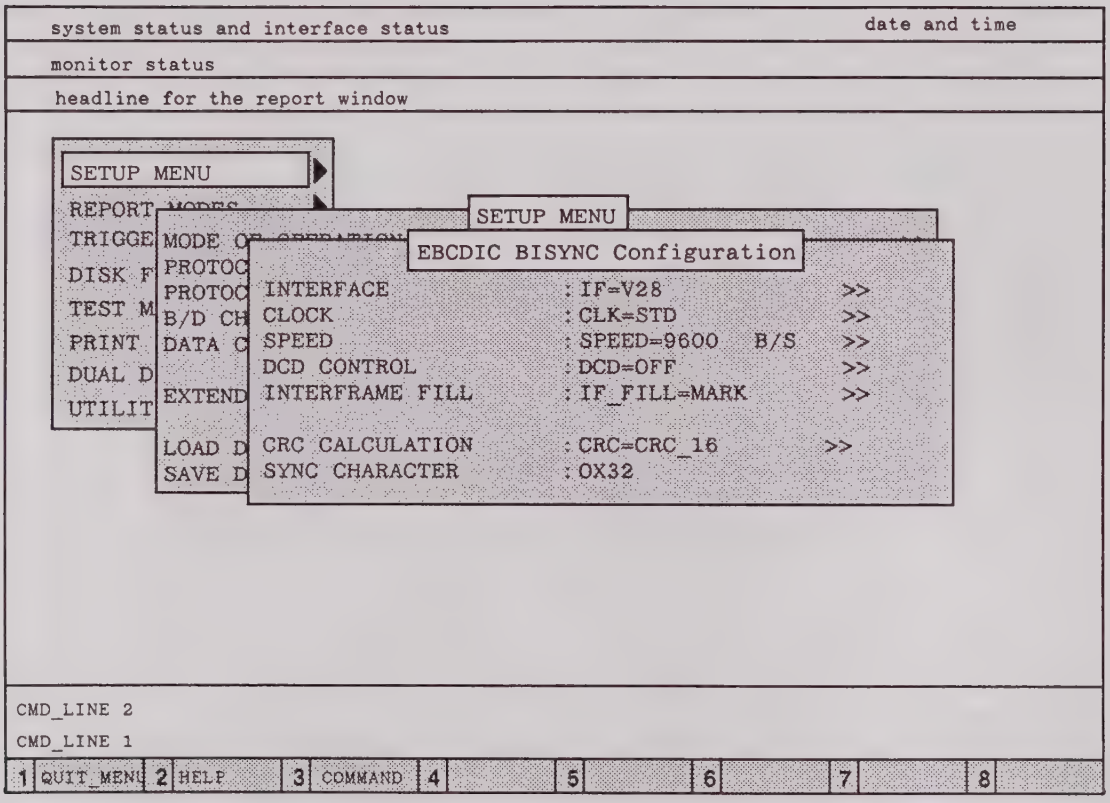
2.2.7 COP (Character oriented procedure) CONFIGURATION MENU



MENU SELECTION:	
INTERFACE *	: Select interface type (V11, V28, V35, V36)
CLOCK	: Select clock Standard, External
SPEED	: Select interface speed
DCD CONTROL	: Set Data Carrier Detect ON/OFF
INTERFRAME FILL	: Set interframe fill to SPACE, MARK SYNC
BITS/CHARACTER	: Set bits per character to 5, 6, 7, 8
PARITY	: Set parity to NONE, ODD, EVEN
SYNC CHARACTER	: Enter SYNC character in HEX
SYNC RESET	: Enter SYNC RESET in HEX
REST IDLE	: Set idle condition to SPACE, MARK
STRIP SYNC	: Select strip sync ON/OFF
FRAM LENGTH	: Enter frame count for receiver

* Only available with V/X interface

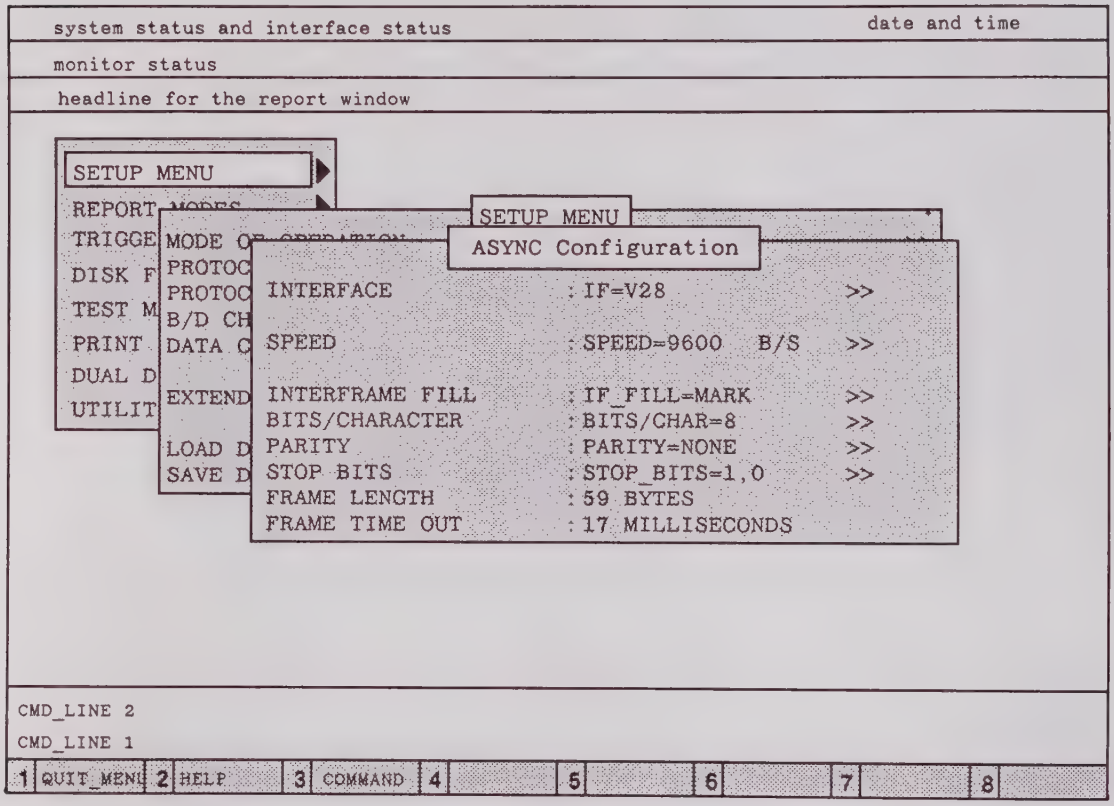
2.2.8 BISYNC EBCDIC/ASCII (BSC) CONFIGURATION MENU


system status and interface status
date and time
monitor status
headline for the report window
SETUP MENU
SETUP MENU
EBCDIC BISYNC Configuration
INTERFACE : IF=V28 >>
CLOCK : CLK=STD >>
SPEED : SPEED=9600 B/S >>
DCD CONTROL : DCD=OFF >>
INTERFRAME FILL : IF_FILL=MARK >>
CRC CALCULATION : CRC=CRC_16 >>
SYNC CHARACTER : 0X32
CMD_LINE 2
CMD_LINE 1
1 QUIT_MENU 2 HELP 3 COMMAND 4 5 6 7 8

MENU SELECTION:	
INTERFACE *	: Select interface type (V11, V28, V35, V36)
CLOCK	: Select clock Standard, External
SPEED	: Select interface speed
DCD CONTROL	: Set Data Carrier Detect ON/OFF
INTERFRAME FILL	: Set interframe fill to SPACE, MARK SYNC
CRC CALCULATION	: Select CRC CCITT, CRC 16, VRC/LRC.
SYNC CHARACTER	: Enter SYNC character in HEX

* Only available with V/X interface

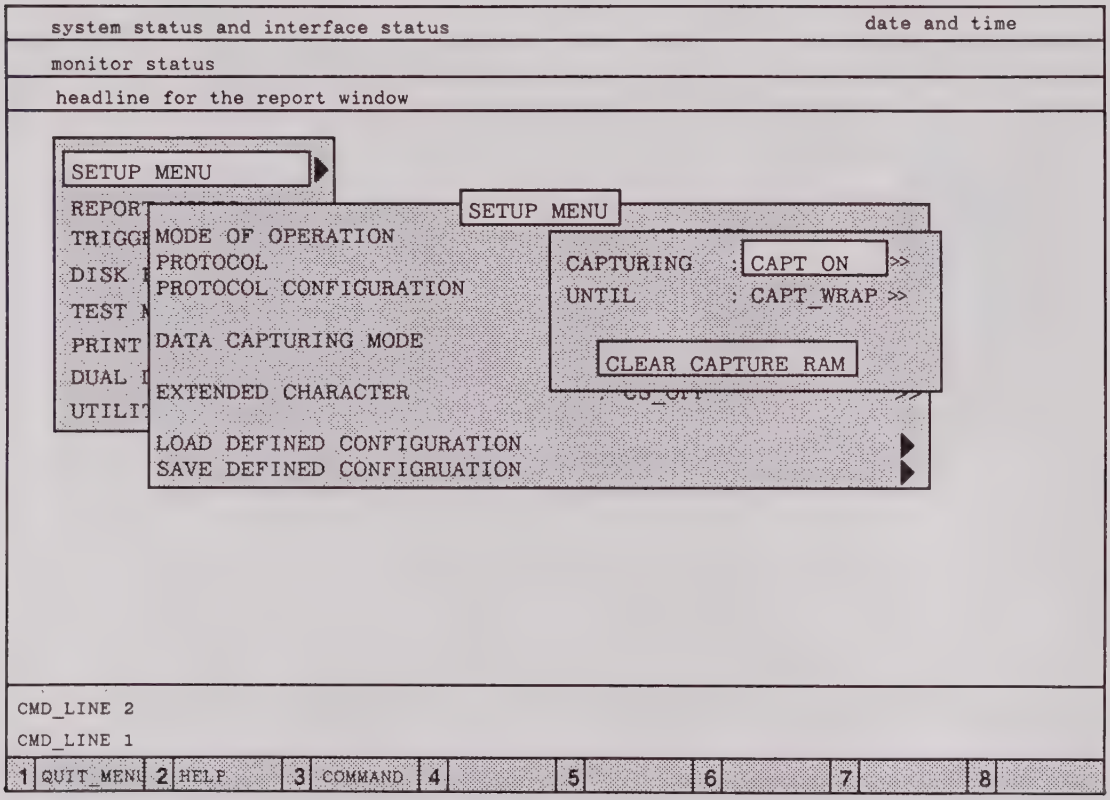
2.2.9 ASYNC CONFIGURATION MENU



MENU SELECTION:	
INTERFACE *	: Select interface type (V11, V28, V35, V36)
SPEED	: Select interface speed
INTERFRAME FILL	: Set interframe fill to SPACE, MARK SYNC
BITS/CHARACTER	: Set bits per character to 5, 6, 7, 8
PARITY	: Set parity to NONE, ODD, EVEN
STOP BITS	: Set number of stop bits to 1, 1.5, 2
FRAM LENGTH	: Enter frame count for receiver
FRAME TIMEOUT	: Enter frame timeout for receiver in milliseconds

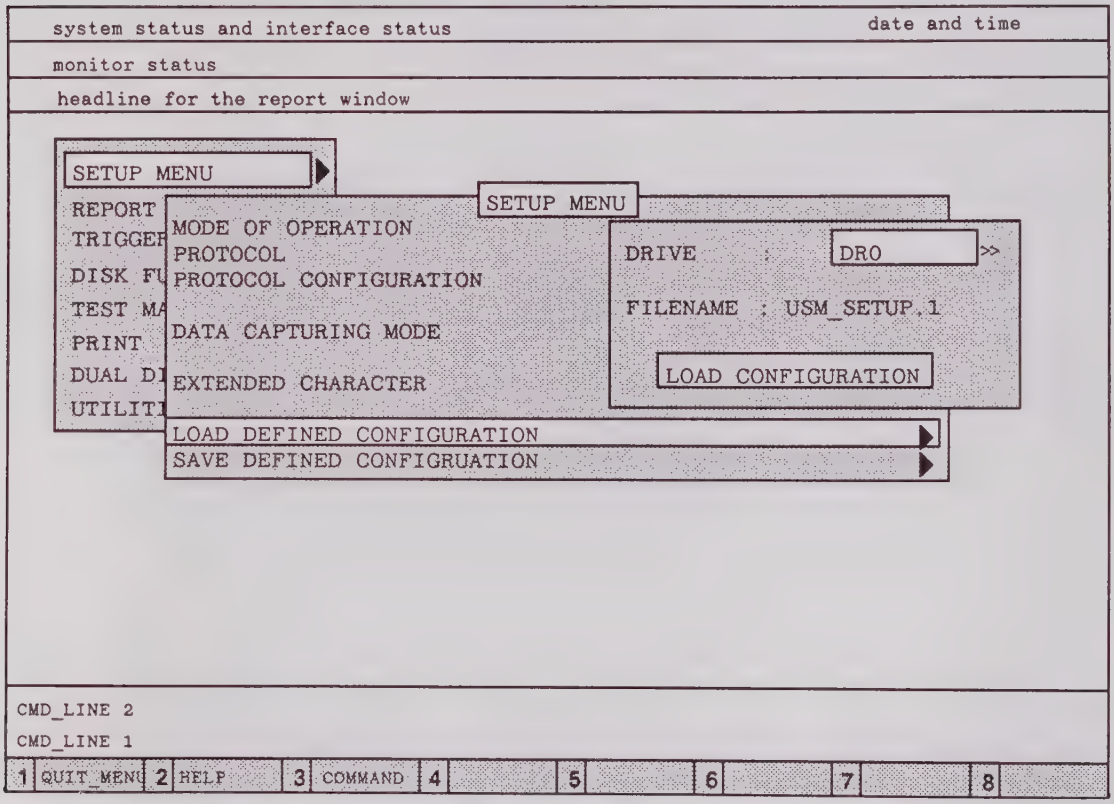
* Only available with V/X interface

2.2.9.1 DATA CAPTURING MODE



MENU SELECTION:	
CAPTURING	: Switch data capture on or off
UNTIL	: Capture overwrite or capture full
CLEAR CAPTURE RAM	: Delete contents of capture RAM

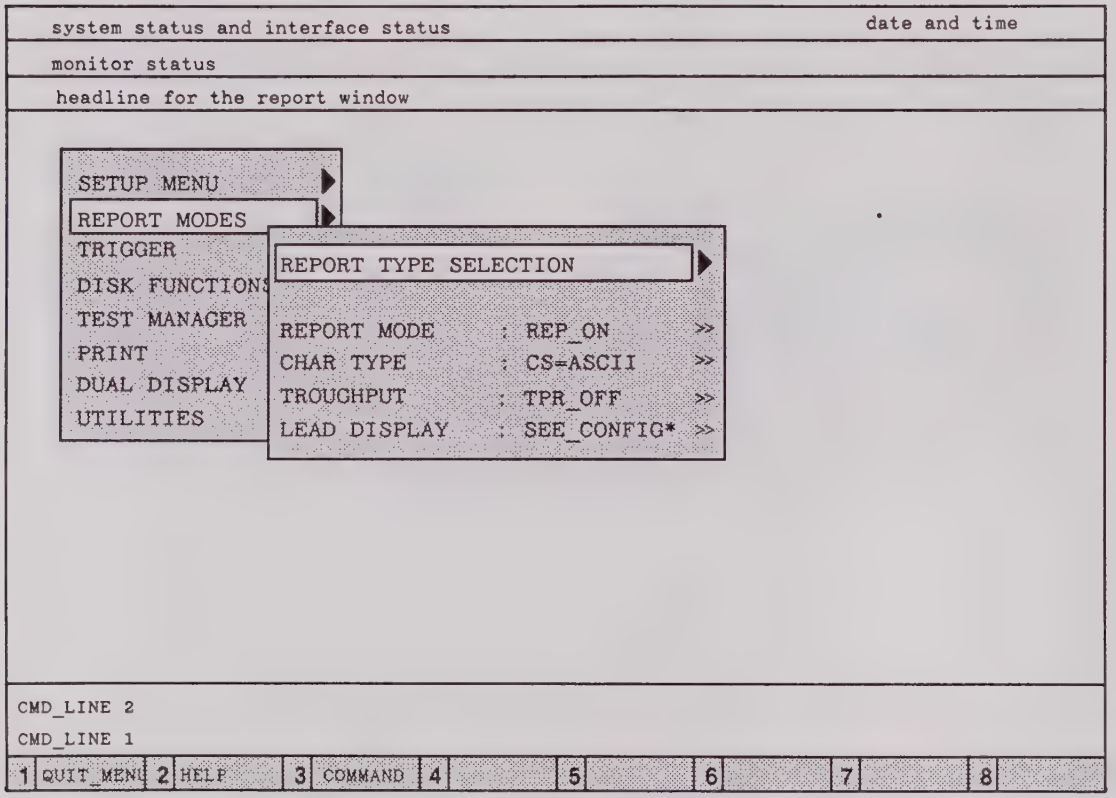
2.2.9.2 LOAD OR SAVE SETUP



MENU SELECTION:

DRIVE	: Select drive for setup file
FILENAME	: Enter name of setup file
LOAD DEFINED CONFIGURATION	: Execute loading of setup file
SAVE DEFINED CONFIGURATION	: Save current configuration in a setup file

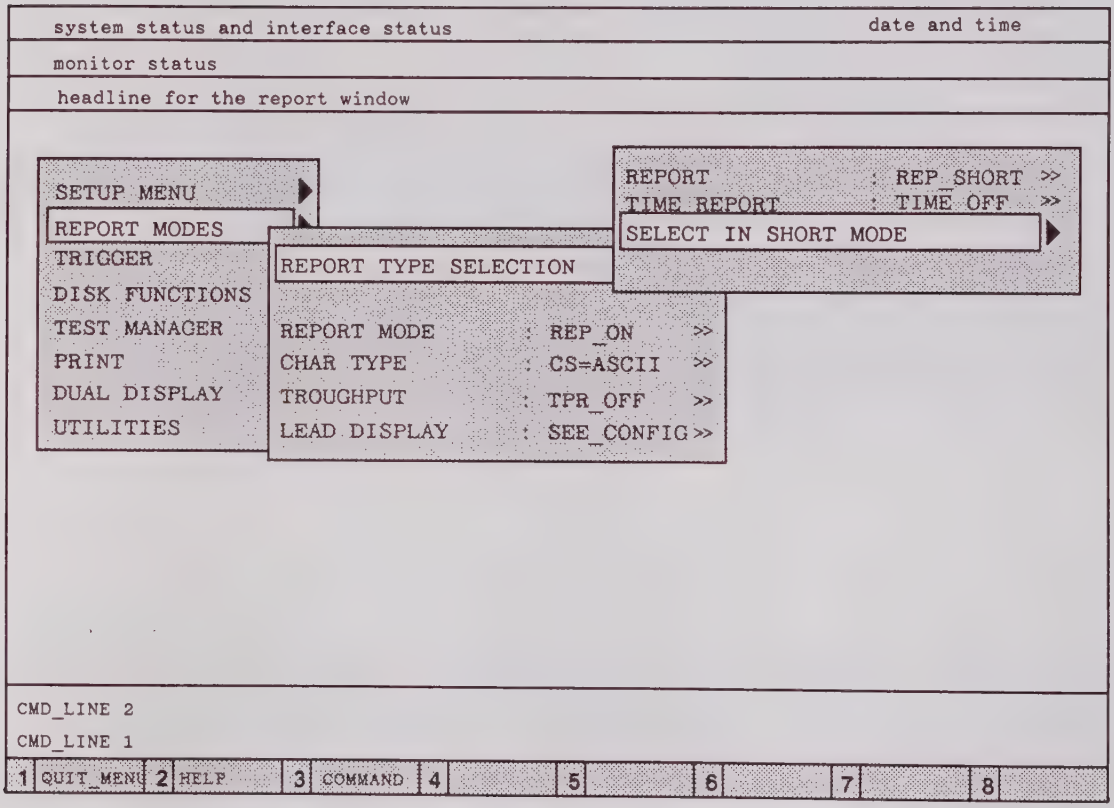
2.2.10 REPORT MODES MENU



MENU SELECTION:	
REPORT TYPE SELECTION	: Enter menu to select report type
REPORT MODE	: Select report display ON/OFF
CHAR TYPE	: Select character display mode
THROUGHPUT	: Select through put measurement ON/OFF
LEAD DISPLAY*	: Select interface leads display ON/OFF

* Only available on V/X interface.

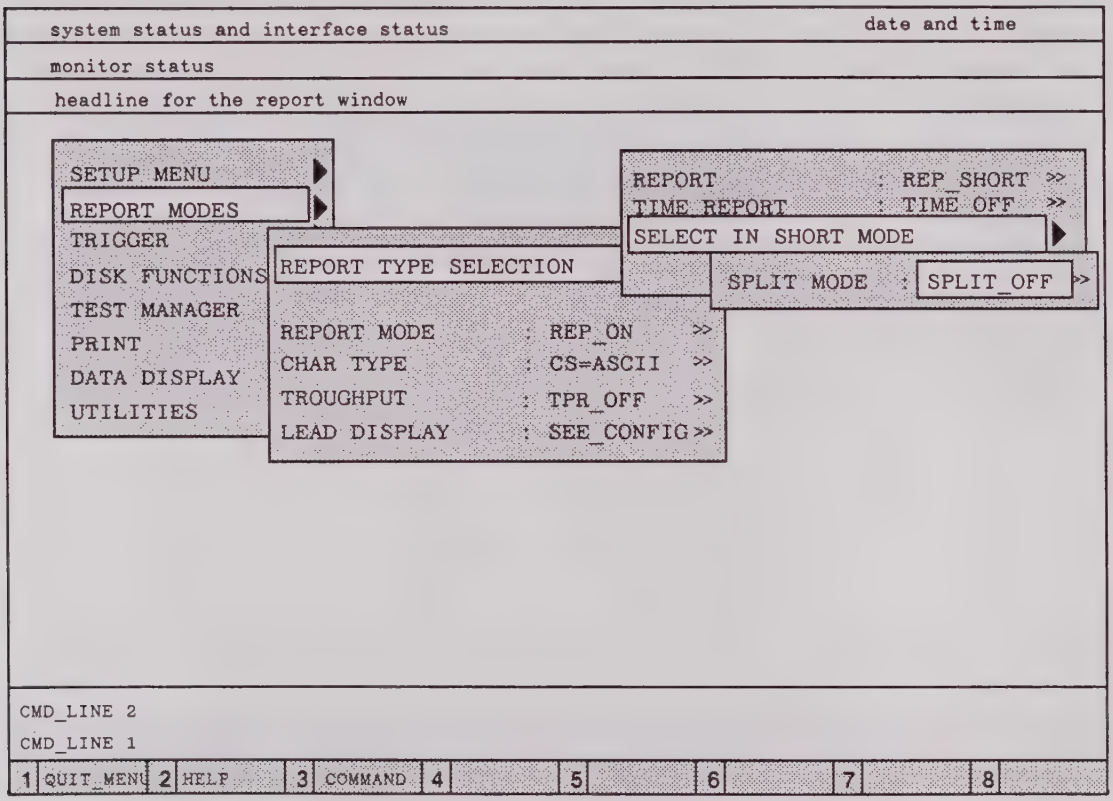
2.2.10.1 REPORT TYPE SELECTION



MENU SELECTION:

REPORT	: Select report display format as SHORT, HEX, CHARACTER
TIME REPORT	: Switch frame timestamp report (ON/OFF/SEC/ HOUR/YEAR)
SELECT IN SHORT MODE	: Select menu in short mode

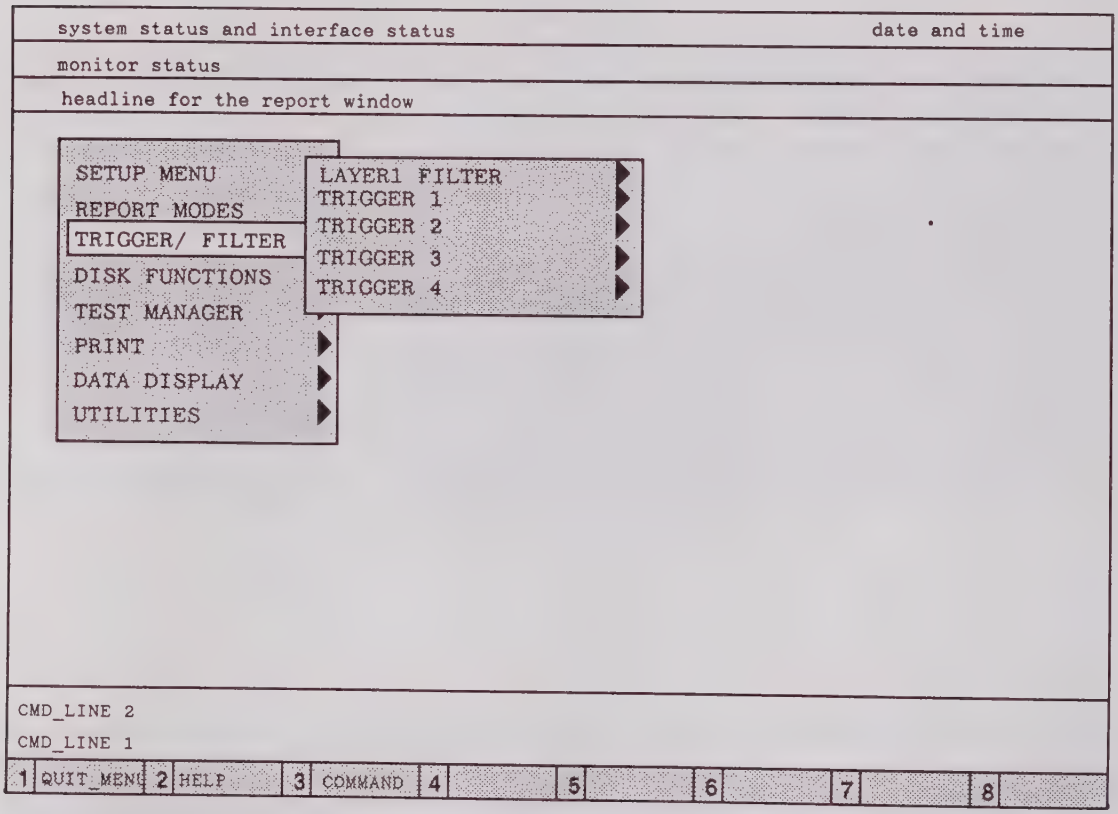
2.2.10.1.1 SELECT IN SHORT MODE



MENU SELECTION:

SPLIT MODE : Select in short mode split screen ON or OFF

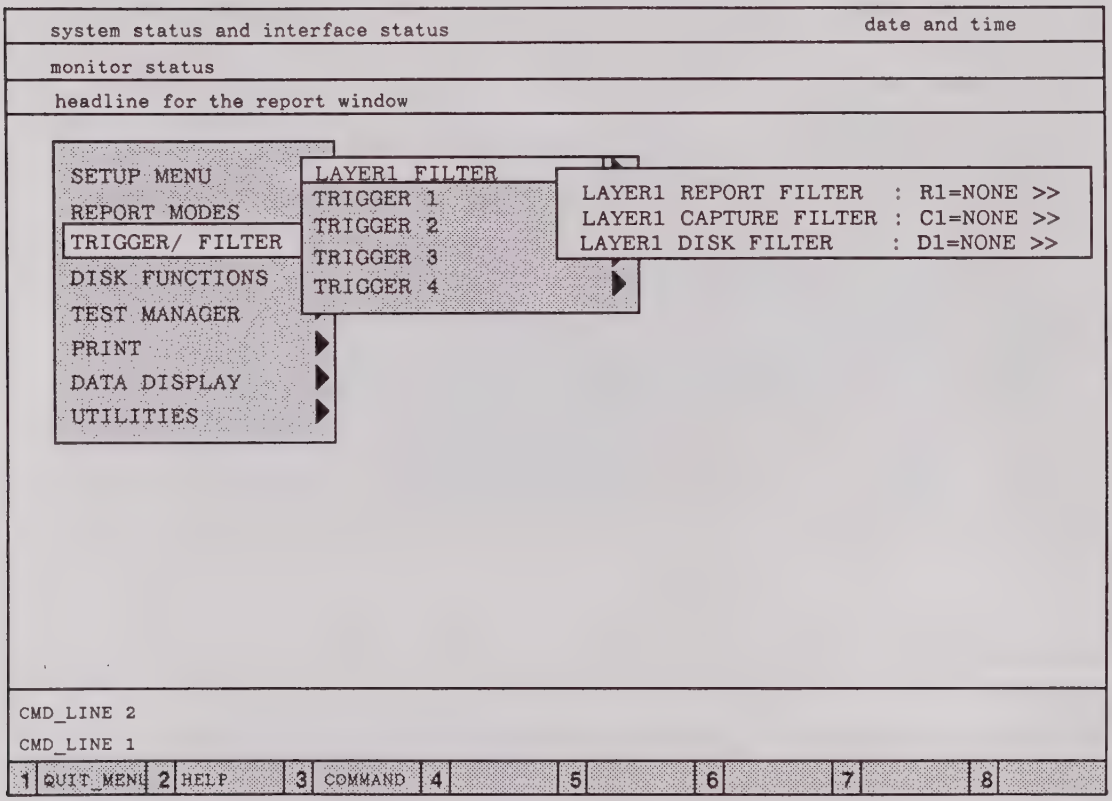
2.2.11 TRIGGER/ FILTER MENU



MENU SELECTION:

LAYER1 FILTER	: Enter Layer1 Filter menu
TRIGGER 1	: Enter trigger machine 1 selection menu
TRIGGER 2	: Enter trigger machine 2 selection menu
TRIGGER 3	: Enter trigger machine 3 selection menu
TRIGGER 4	: Enter trigger machine 4 selection menu

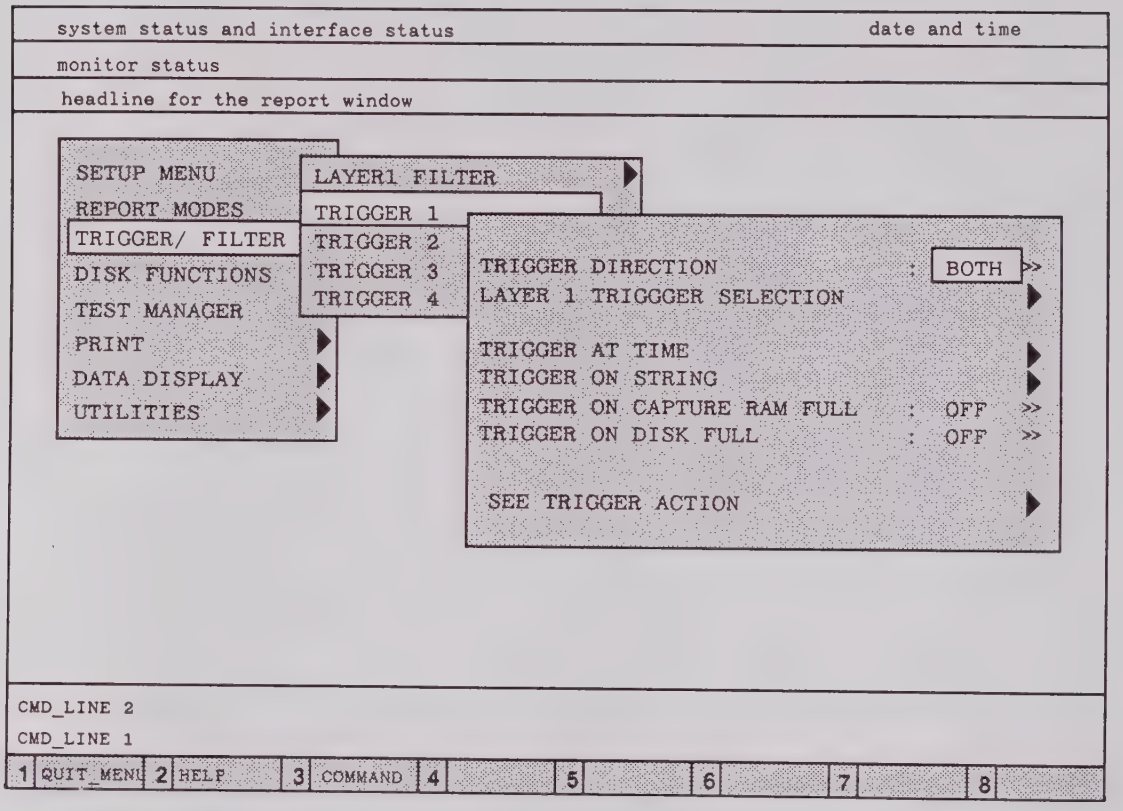
2.2.12 LAYER1 FILTER MENU



MENU SELECTION:

LAYER1 REPORT FILTER	: R1=ALL– Reports all control lead changes R1=NONE – Turns off control lead change report
LAYER1 CAPTURE FILTER	: C1=ALL– Captures all control lead changes C1=NONE – Turns off capture of control lead changes
LAYER1 DISK FILTER	: D1=ALL– Records all control lead changes D1=NONE – Turns off recording of control lead changes

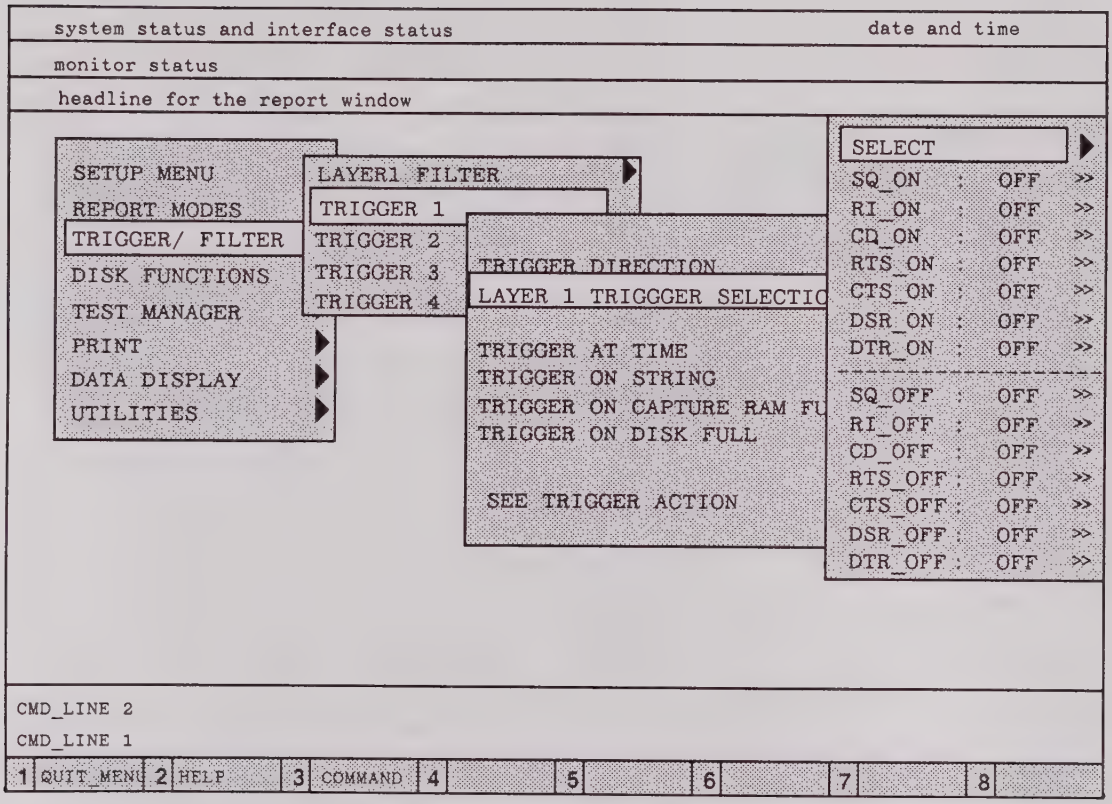
2.2.12.1 TRIGGER 1..4



MENU SELECTION:

TRIGGER DIRECTION	: Selects the trigger direction (BOTH/DTE/ DCE/PLAYBACK)
LAYER 1 TRIGGER SELCTION	: Enter menu to select trigger on layer 1 events
TRIGGER AT TIME	: Enter menu to select time trigger
TRIGGER ON STRING	: Enter menu to select string trigger
TRIGGER ON CAPTURE RAM FULL	: Select trigger on capture RAM full event
TRIGGER ON DISK FULL	: Select trigger on disk full event
SEE TRIGGER ACTION	: Enter menu to see current trigger action

2.2.12.1.1 LAYER 1 TRIGGER SELECTION*

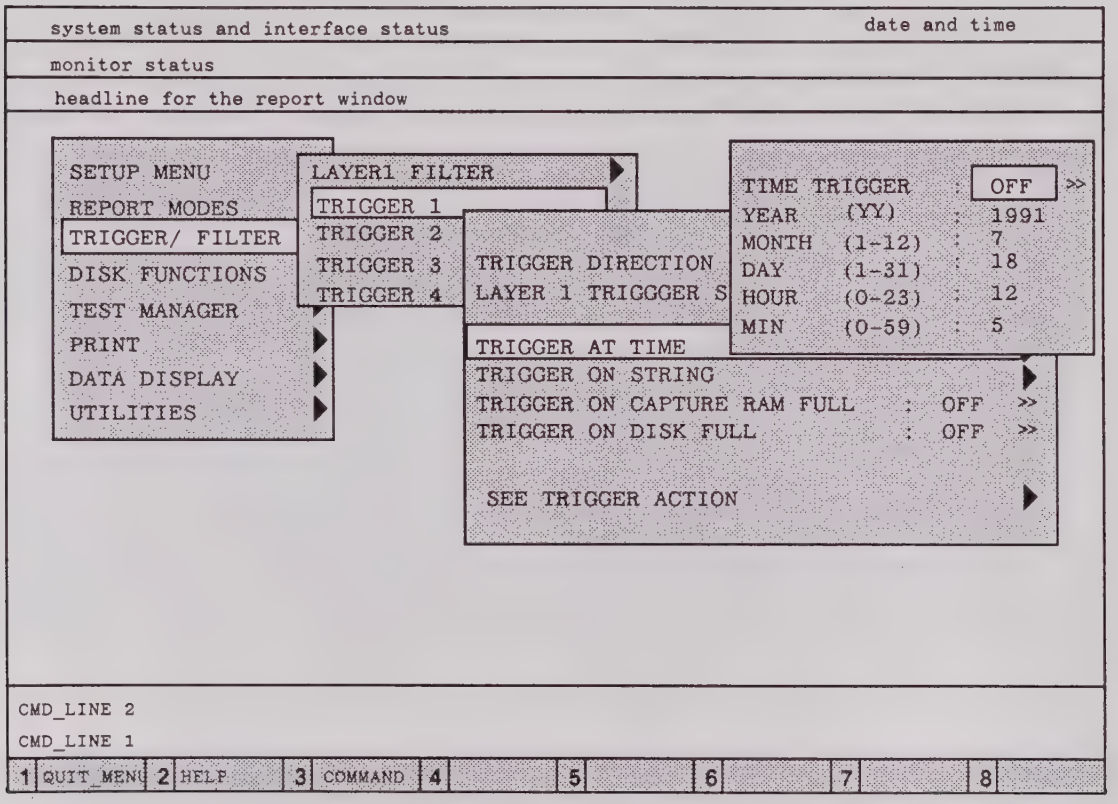


* only available with V/X Interface

MENU SELECTION:

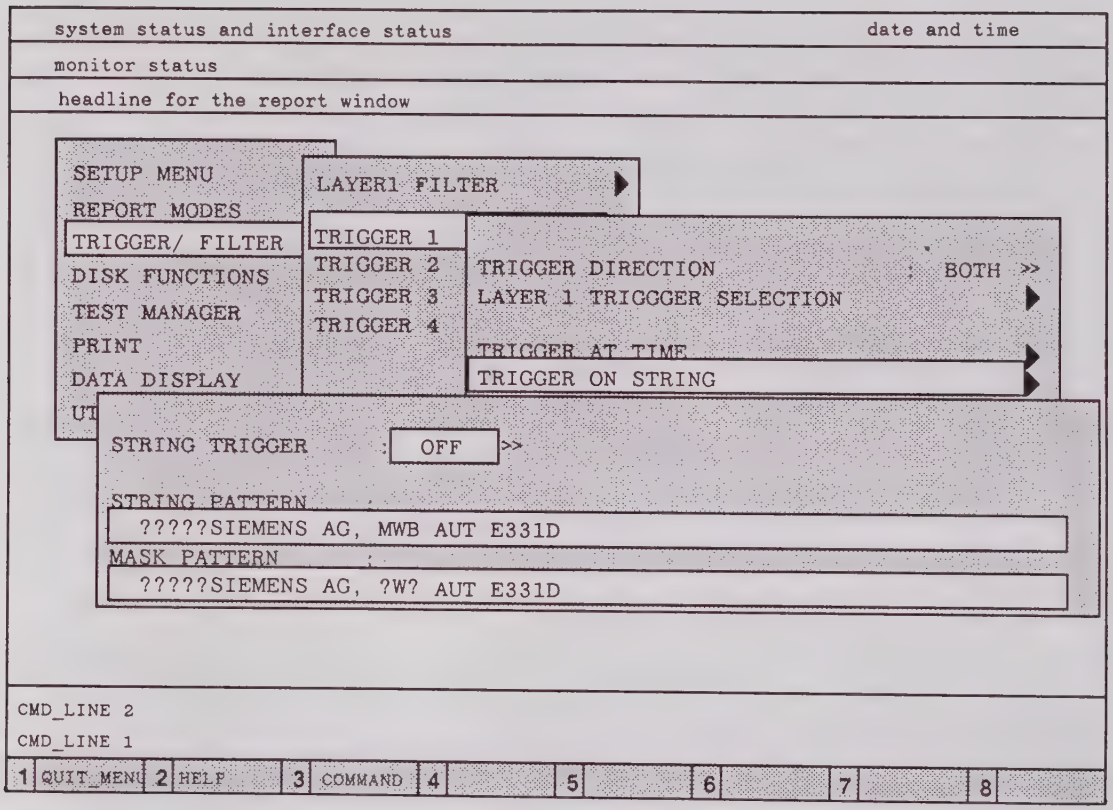
ALL	: Enable all layer 1 trigger events
NONE	: Disable all layer 1 trigger events
SQ_ON	: Enable or disable trigger on positive transition for signal quality
RI_ON	: Enable or disable trigger on positive transition for ring indication
CD_ON	: Enable or disable trigger on positive transition for carrier detect
RTS_ON	: Enable or disable trigger on positive transition for request to send
CTS_ON:	: Enable or disable trigger on positive transition for clear to send
DSR_ON	: Enable or disable trigger on positive transition for data set ready
DTR_ON	: Enable or disable trigger on positive transition for data terminal ready
SQ_OFF	: Enable or disable trigger on negative transition for signal quality
RI_OFF	: Enable or disable trigger on negative transition for ring indication
CD_OFF	: Enable or disable trigger on negative transition for carrier detect
RTS_OFF	: Enable or disable trigger on negative transition for request to send
CTS_OFF	: Enable or disable trigger on negative transition for clear to send
DSR_OFF	: Enable or disable trigger on negative transition for data set ready
DTR_OFF	: Enable or disable trigger on negative transition for data terminal ready

2.2.12.1.2 TRIGGER AT TIME



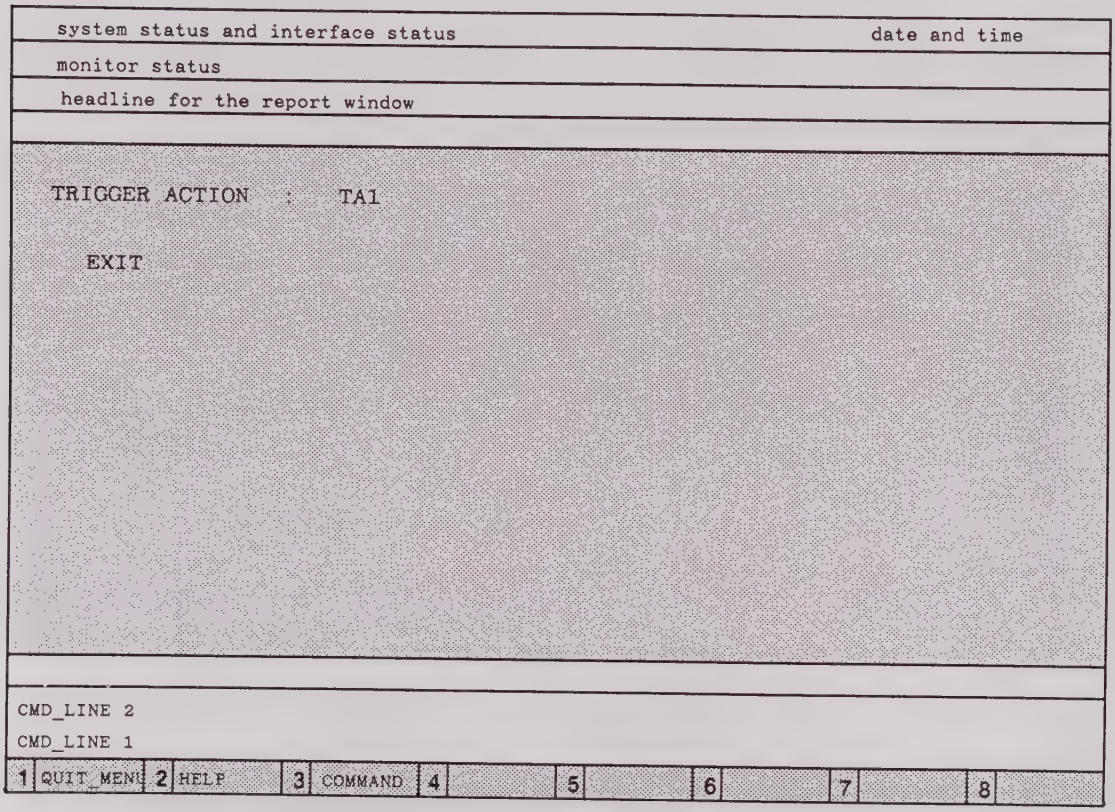
MENU SELECTION:	
TIME TRIGGER	: Enable or disable time trigger
YEAR	: Enter year
MONTH	: Enter month
DAY	: Enter day
HOUR	: Enter hour
MIN	: Enter minutes

2.2.12.1.3 TRIGGER ON STRING



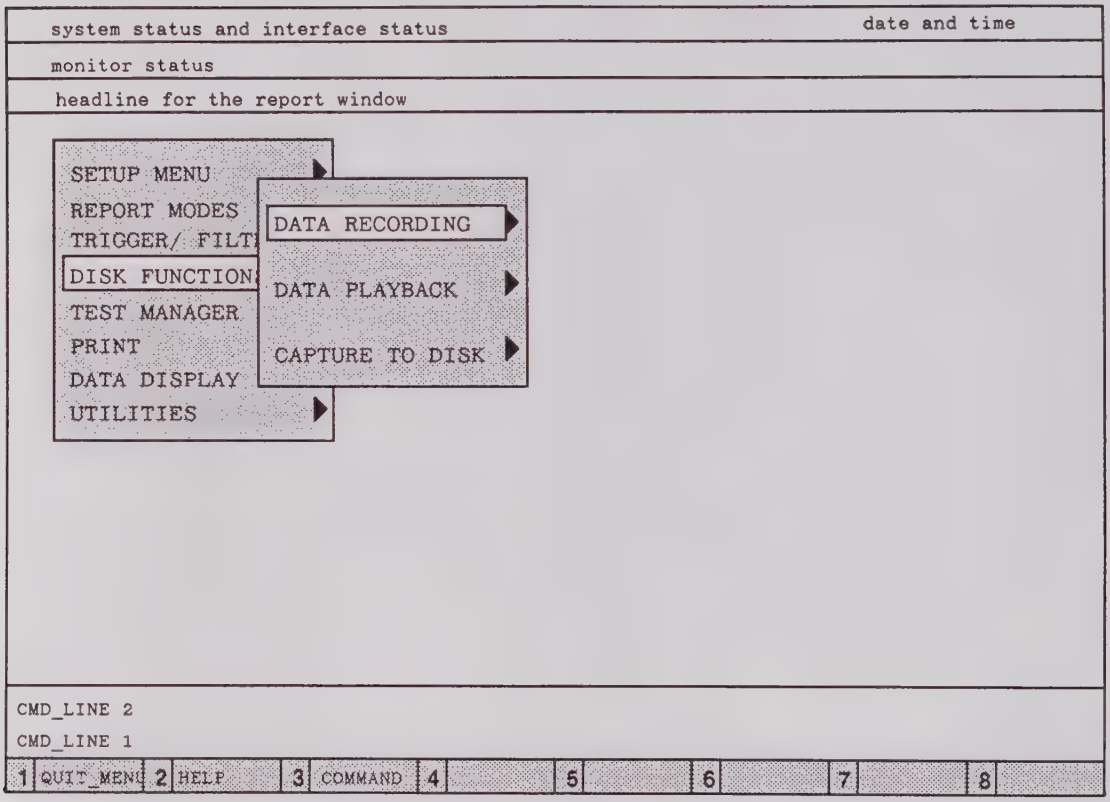
MENU SELECTION:	
STRING TRIGGER	: Enable or disable string trigger
STRING PATTERN	: Enter string to be triggered on
MASK PATTERN	: Enter wanted mask

2.2.12.1.4 SEE TRIGGER ACTION



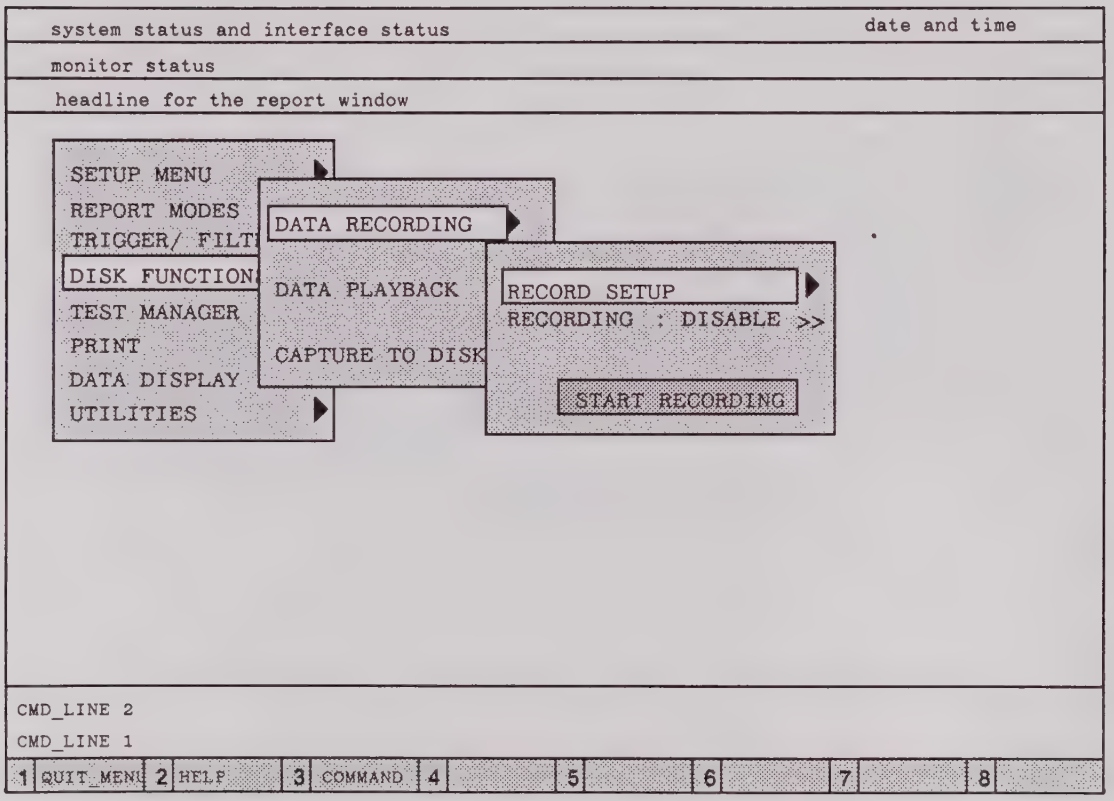
MENU SELECTION:
TRIGGER ACTION

2.2.13 DISK FUNKTION MENU



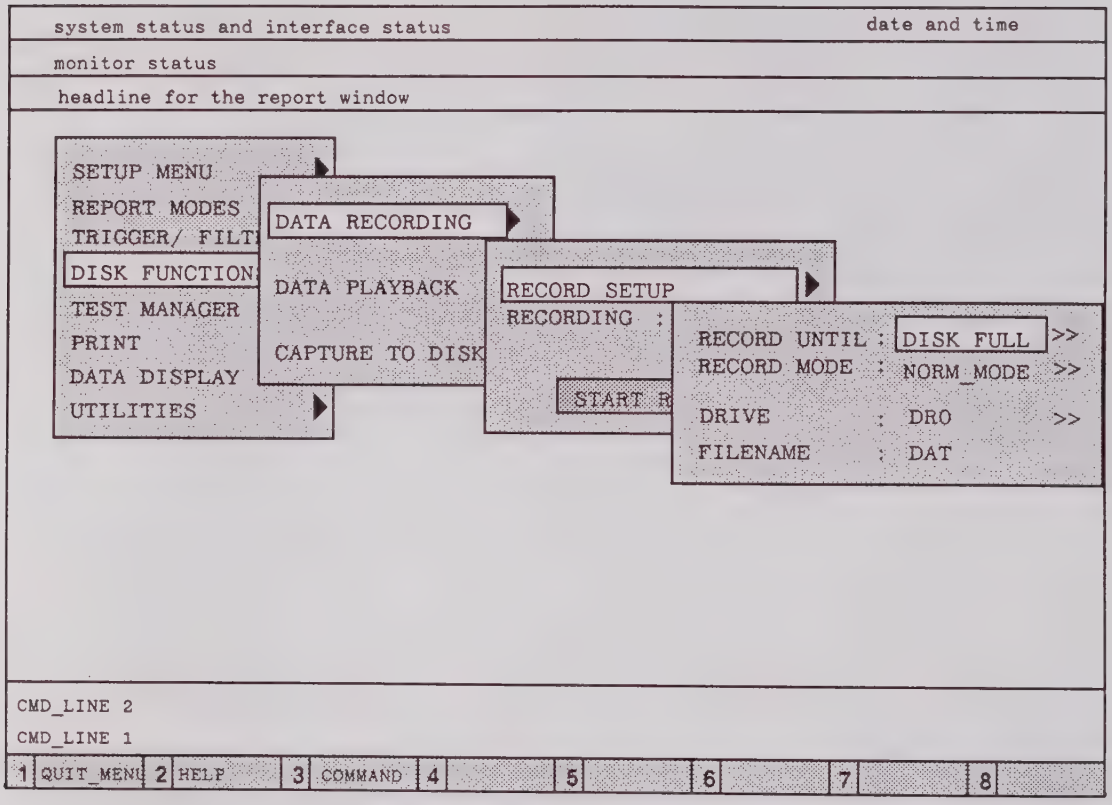
MENU SELECTION:	
DATA RECORDING	: Enter data recording menu
DATA PLAYBACK	: Enter data playback menu
CAPTURE TO DISK	: Enter menu to copy capture contents to disk

2.2.13.1 DATA RECORDING MENU



MENU SELECTION:	
RECORD SETUP	: Enter recording setup menu
RECORDING	: Enable or disable data recording
START RECORDING	: Execute start or stop of data recording

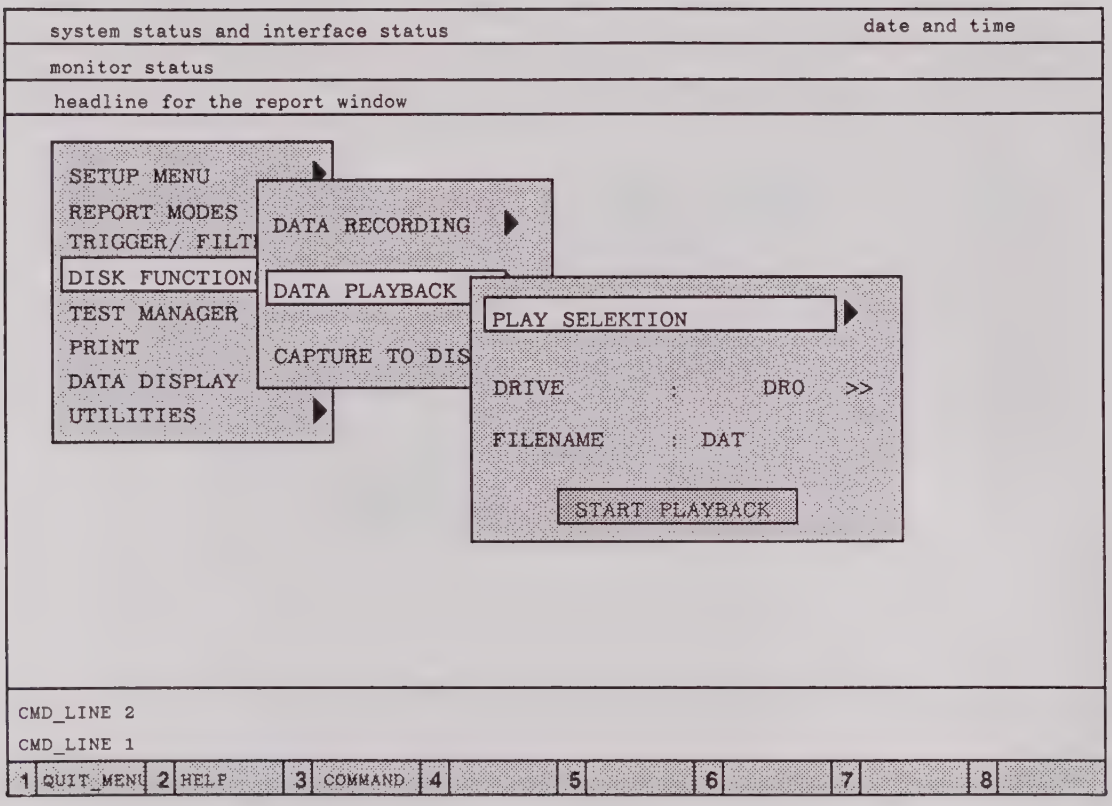
2.2.13.1.1 RECORDING SETUP MENU



MENU SELECTION:

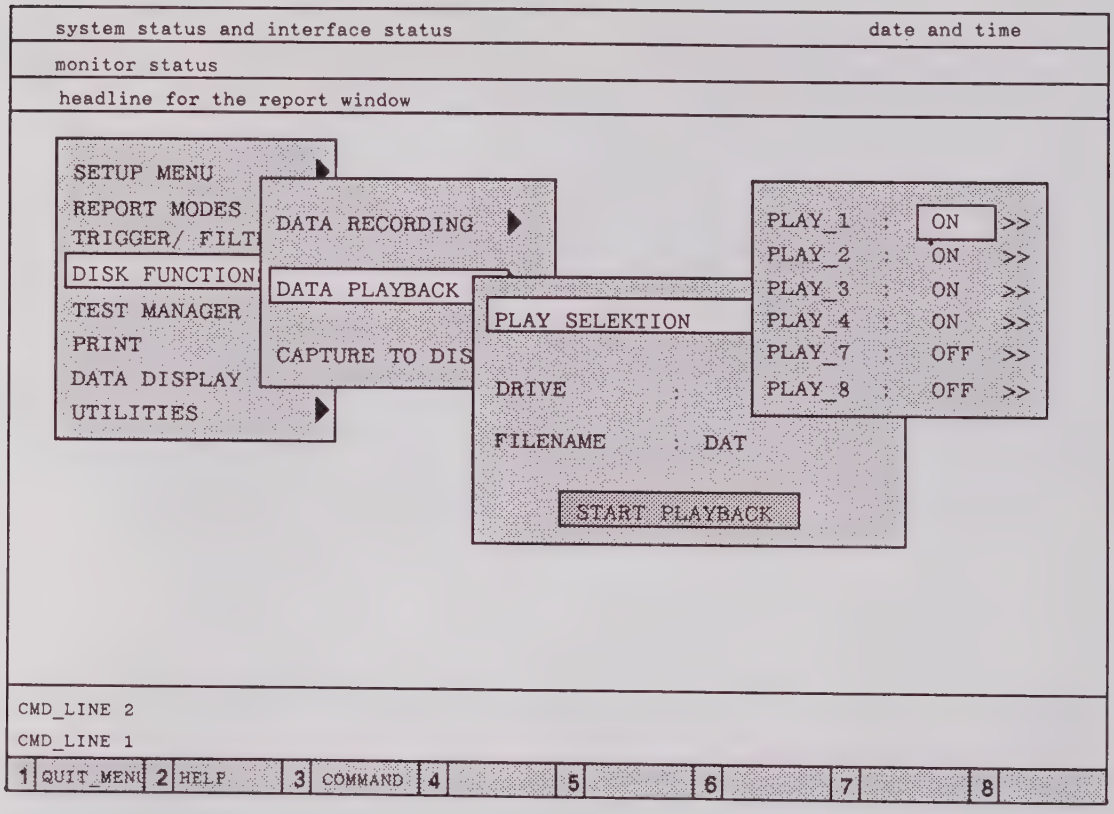
RECORD UNTIL	: Disk full or disk overwrite
RECORD MODE	: Select normal or fast mode
DRIVE	: Select drive for data recording
FILENAME	: Enter name of data recording file

2.2.13.2 DATA PLAYBACK MENU



MENU SELECTION:	
PLAY SELECTION	: Enter menu for playback selection
DRIVE	: Select drive for data playback
FILENAME	: Enter name of data playback file
START PALYBACK	: Execute start or stop of data playback

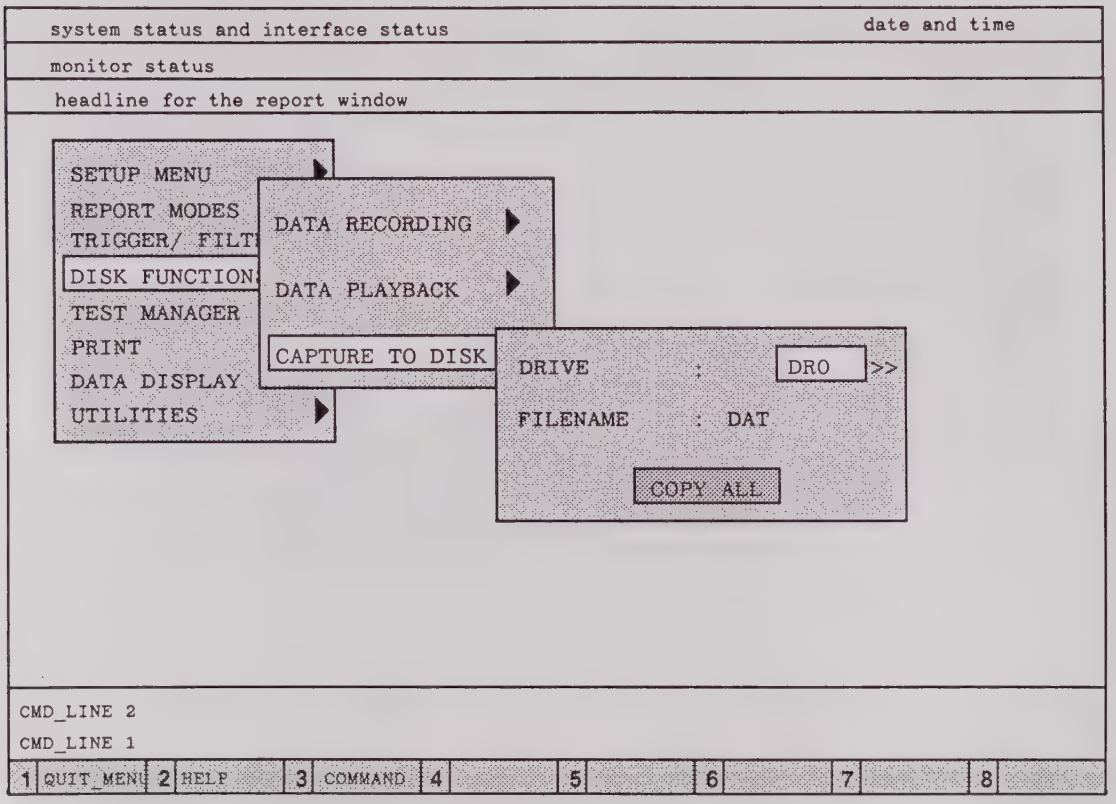
2.2.13.2.1 PLAY SELECTION MENU



MENU SELECTION:

PLAY 1 / .. / PLAY 8 : Turn ON or OFF display of data from the selected CPU when doing playback of data files.

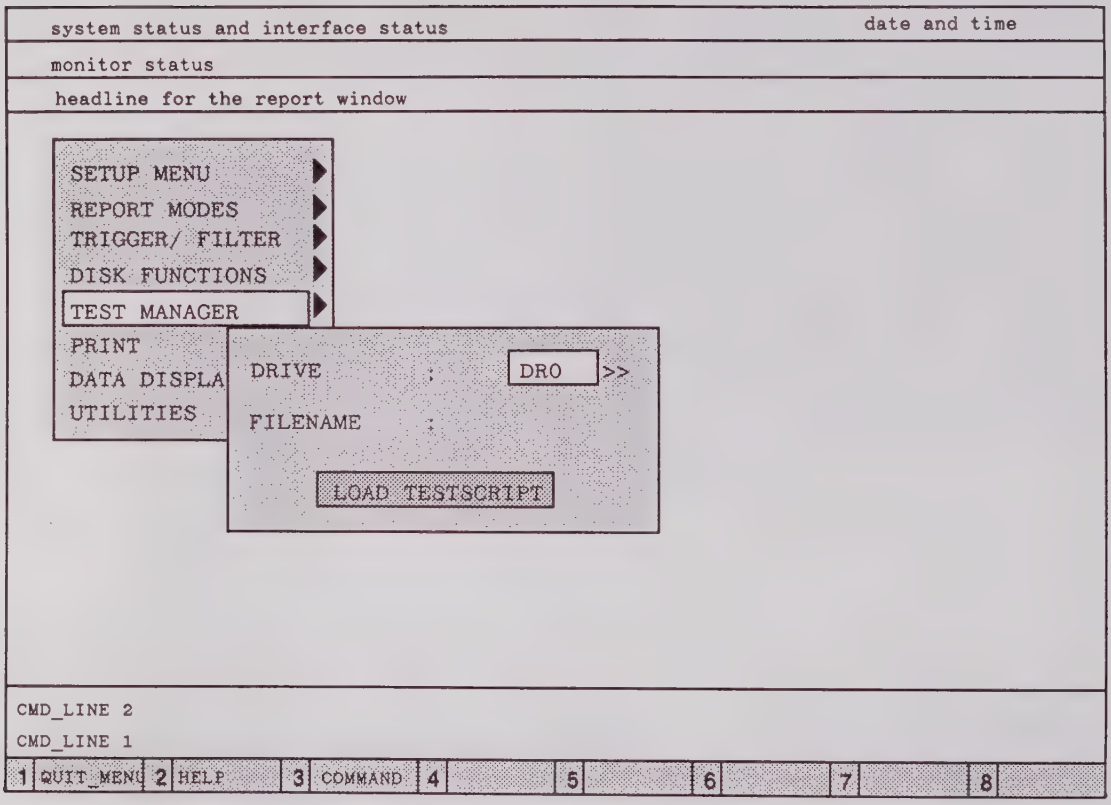
2.2.13.3 CAPTURE TO DISK MENU



MENU SELECTION:

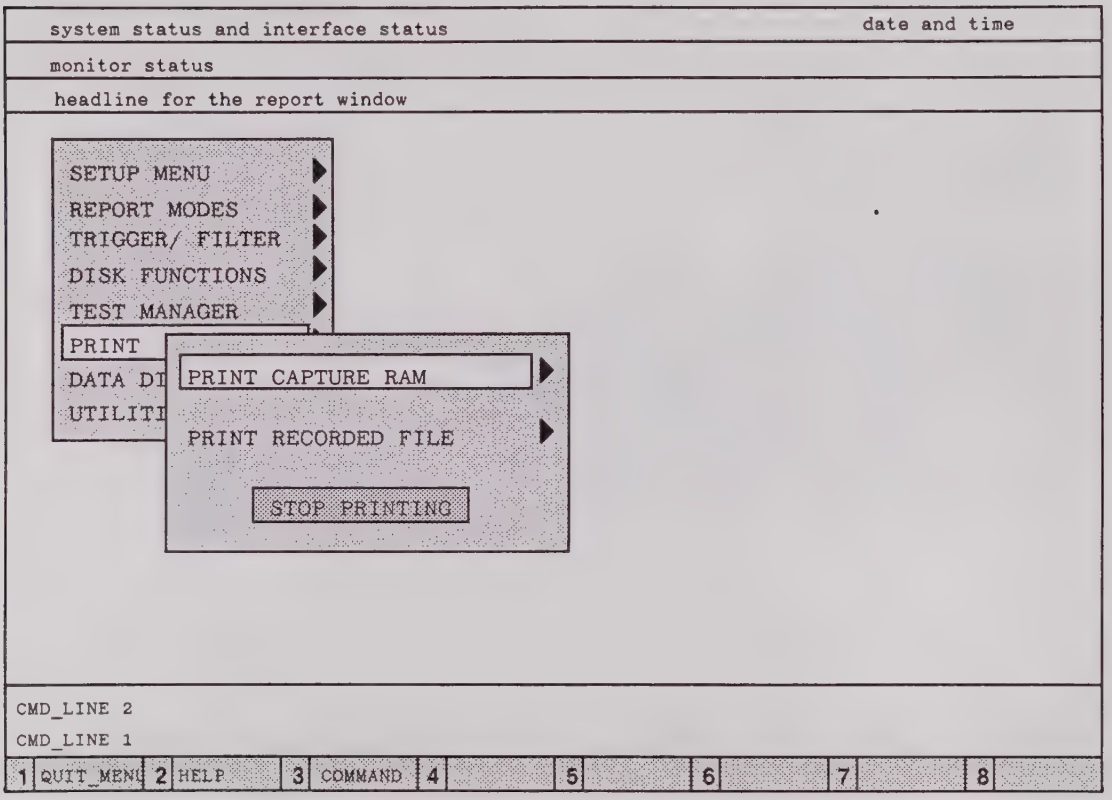
DRIVE	: Select drive for data file
FILENAME	: Enter name of data file
COPY ALL	: Copy contents of capture RAM to data file

2.2.14 TEST MANAGER MENU



MENU SELECTION:	
DRIVE	: Select drive of test manager file
FILENAME	: Enter name of test manager file
LOAD TESTSCRIPT	: Start loading of test manager program

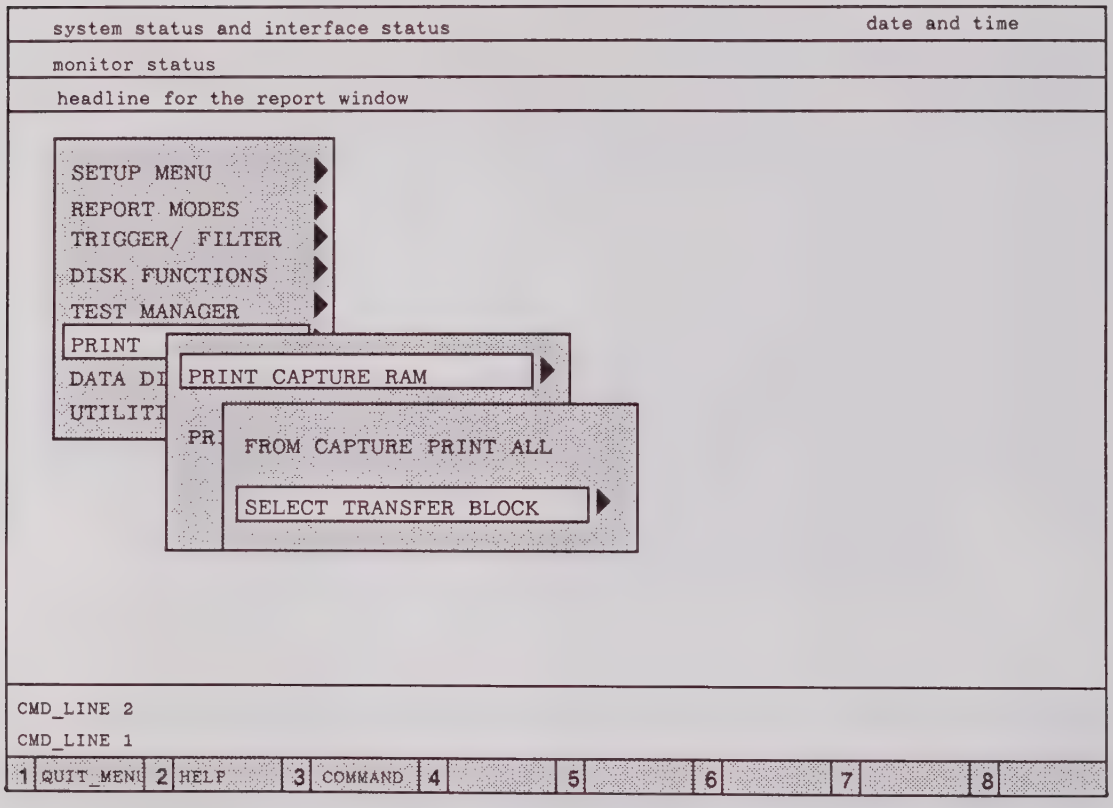
2.2.15 PRINT MENU



MENU SELECTION:

PRINT CAPTURE RAM	: Enter menu of capture RAM printing
PRINT RECORDED FILE	: Enter menu of recorded file printing
STOP PRINTING	: Stop printout

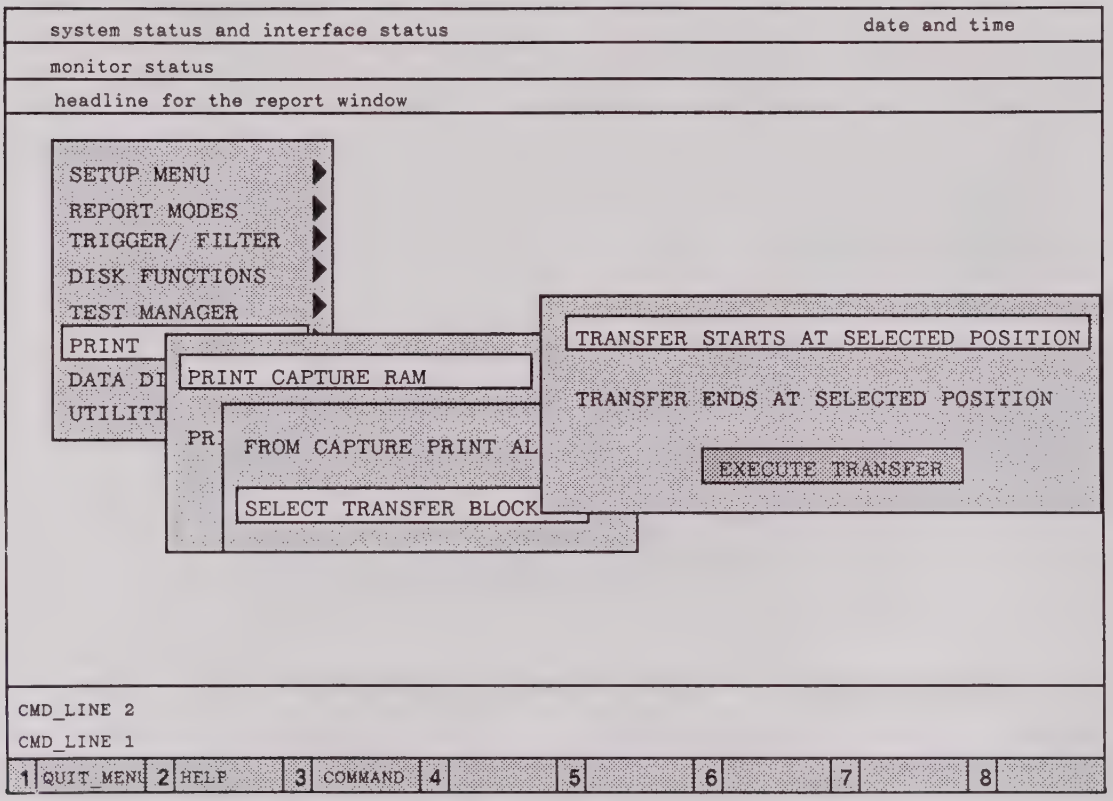
2.2.15.1 PRINT CAPTURE RAM



MENU SELECTION:

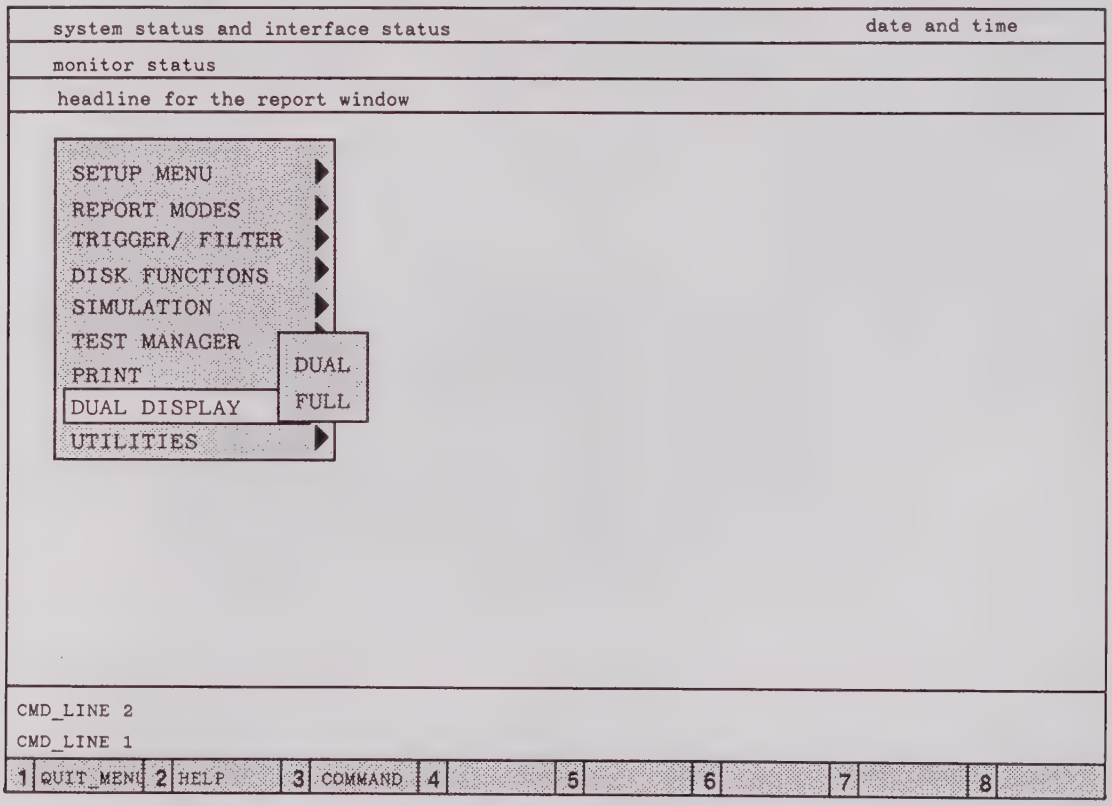
FROM CAPTURE PRINT ALL	: Send contents of capture RAM to printer
SELECT TRANSFER BLOCK	: Enter menu select transfer block

2.2.15.1.1 SELECT TRANSFER BLOCK FROM CAPTURE



MENU SELECTION:	
TRANSFER START	: Start transfer from the frame last scrolled
TRANSFER END	: End transfer at the frame last scrolled
EXECUTE TRANSFER	: Execute start transfer data from capture

2.2.16 DUAL DISPLAY



MENU SELECTION:

DUAL	: Enable display dual screen
FULL	: Enable display full screen

2.2.17 UTILITIES

see User Manual

2.3 COMMANDS

This section describes the commands that are supported by the Monitor. All the function key entries can be entered as command for fast intermenu usage. The commands are classified into general, report display, capture ram, disk operation, data transfer, interface lead selection and throughput measurement commands.

2.3.1 GENERAL COMMANDS

HALT (--)
Enter the HALT mode.

FREEZE (--)
Enter the FREEZE mode.

MONITOR (--)
Enter the MONITOR mode.

NORM_MODE (--)
Select the normal processing of report display, capture ram, disk recording, triggers, filters and Test Manager. This is the default mode of operation.

FAST_MODE (--)
Allows only capture and disk recording. This mode is used for high speed recording of data when receiver overflows can happen in NORM_MODE.

CLEAR_CRT (--)
Clear the display screen.

2.3.1.1 B-CHANNEL MONITORING

The following command is only valid for monitoring on a K1197 with S0/S2M Interface:

=BCH_MON **(channel --)**
Selects the specified B-channel to the current CPU.

2.3.2 REPORT DISPLAY COMMANDS

This section describes the commands that are related to setting up the report display.

REP_ON **(--)**
The report display is on

REP_OFF **(--)**
The report display is off

REP_SHORT **(--)**
Select SHORT report type.

REP_HEX **(--)**
Select HEX report type

REP_CHAR **(--)**
Select CHARACTER report type

The Monitor may be set to display the timestamps or block number for each frame in REP_COMP, REP_HEX or REP_CHAR report format. The following commands are used for this selection:

TIME_YEAR (--)
Begin of frame timestamps is reported as year, month and day.

TIME_OFF (--)
Frame timestamps are not reported, block counts are reported.

TIME_HOUR (--)
Start of frame timestamps are reported as hour, minute, second, and hundreds of milliseconds.

TIME_SEC (--)
Frame timestamps are reported as second, millisecond, and microseconds.

TIME_HOUR (--)
The timestamps for events are reported as hours, minutes, seconds and hundreds of milliseconds

TIME_YEAR (--)
The timestamps for events are reported as year, month and day.

SPLIT_ON (--)
Split mode of display is turned on. User and Network displays are on separate halfes of the screen. (Note that the command SPLIT_ON automatically sets the REP_SHORT)

2.3.3 CAPTURE RAM COMMANDS

This section describes the commands that are used to setup the capture ram and retrieve data from it.

2.3.3.1 GENERAL

CAPT_ON (--)
The data is saved in capture ram when in Monitor state.

CAPT_OFF (--)
The data is not saved in capture ram.

CAPT_WRAP (--)
Capture buffer initialized with overwrite selected.

CAPT_FULL (--)
Capture buffer initialized with overwrite off. The capture will continue until the buffer is full, then stop.

FROM_CAPT (--)
Capture ram is selected as source of data when in Halt state.

2.3.3.2 SCROLL CONTROL FOR CAPTURE AND DISK PLAYBACK

FORWARD	Scroll forward one line	– down arrow
BACKWARD	Scroll backward one line	– up arrow
SCRN_FWD	Scroll forward one screen	– CTRL down arrow
SCRN_BACK	Scroll backward one screen	– CTRL up arrow
TOP	Scroll one screen from top	– SHIFT CTRL up arrow
BOTTOM	Scroll one screen from bottom	– SHIFT CTRL down arrow

2.3.4 DISK OPERATION COMMANDS

This section describes the commands that are related to the disk operation.

DR0 (--)
Disk drive 0 is selected for recording or playback.

DR1 (--)
Disk drive 1 is selected for recording or playback.

WD0 ... WD7 (--)
Logical disk 0 to 7 is selected for recording or playback. These commands apply if the Winchester Disk Drive is currently partitioned to support the corresponding logical disk. If the physical disk is divided into 4 parts, only WD0 WD3 would be valid. Consequently, the commands WD4 through WD7 would generate a "Non-existent I/O device" error message.

RECORD (--)
Opens a data recording file on disk. Use the form **RECORD " filename"** to specify the recording filename. Use the commands DR0, DR1, WD0,... WD7 (if Winchester drive installed)to specify disk drive. The Disk filter commands can be used to selectively record the data. The Disk Trigger commands for CALLED/CALLING ADDRESSES in a Call Request Packet must be selected after selecting "RECORD". If the data recording file already exists the user is asked, whether he wants to overwrite or not.

PLAYBACK (--)
Opens a data playback file on disk. Use the command **PLAYBACK " filename"** to specify the playback filename. The FORWARD, BACKWARD, TOP, BOTTOM, SCRN_FWD, SCRN_BWD commands can be used to scroll forward or backward through the playback file with the report commands selecting the desired display format.

=TITLE **(string_addr --)**
Enters the disc record or playback title in the form **" title" =TITLE**. The new title is displayed on the status line.

DISK_OFF (--)
The current Disk recording or playback file is closed. This **must** be done **before** opening another file for playback and **after** recording is finished.

ENB_REC (--)
Live data received is saved in a disk recording when in Monitor or Freeze states and a data recording file is open. Data can also be transferred from capture to disk in the Halt state when the CTOD_ON is selected.

DIS_REC (--)
The data is not saved on disk.

FROM_CAPT (--)
Capture ram is selected as source of data when in Halt state.

CTOD_ON (--)
Transfer of data from capture to disk is on when in Halt state.

CTOD_OFF (--)
Transfer of data from capture to disk is off.

2.3.5 DATA TRANSFER COMMANDS

This section describes the commands that are used to transfer data from capture to disk, from capture to printout, and from disk to printout.

TRANSFER (--)
Data will be transferred from capture or disk as selected by the FROM_CAPT or FROM_DISK command. This command is very useful for capture to disk recording transfer or capture or disk playback when report printout is wanted.

QUIT_TRA (--)
Quits the transfer prior to finishing.

TRA_START (--)
This command selects the block to start transfer on. The block selected for start will be the last one scrolled when the TRA_START command is given.

TRA_END (--)
The block selected for end of transfer will be the last one scrolled when the TRA_END command is given. The TRA_START and TRA_END commands are used to allow for partial transfer or printout of a file.

TRA_ALL (--)
If transfer is from the disk the complete disk file will be transferred. If transfer is from the capture RAM then the TRA_START and TRA_END commands determine the amount of data transferred.

SEE_TRA (--)
Displays the interface identifier and block number for the TRA_START and TRA_END selections.

PRINT_ON (--)
Display reports are printed. (Only in HALT state)

PRINT_OFF (--)
Display reports are not printed.

2.3.6 PROGRAMMABLE TRIGGER COMMANDS

This section describes commands to set up the event trigger and call trigger machines.

2.3.6.1 EVENT TRIGGERS

The following commands are used to select one of the four event trigger machines.

TR1 (--)
Select trigger machine #1.

TR2 (--)
Select trigger machine #2.

TR3 (--)
Select trigger machine #3.

TR4 (--)
Select trigger machine #4.

The following commands specify the trigger direction:

=DTE **(--)** Trigger on events received form 'TO DTE' interface direction.

=DCE **(--)** Trigger on events received from 'TO DCE' interface direction.

=BOTH **(--)** Trigger on events received from both directions.

=PLAYBACK **(--)** Trigger on events from disk or capture playback.

There are five types of trigger events categorized as: string trigger, time trigger, lead transition trigger, storage trigger and protocol trigger events.

The following commands set up the string trigger:

=STRING **(string_address --)**
Match trigger string. The string must be defined by quote pairs with " TEXT" for ASCII character strings or with X" 010BFF" for hex values.

Note: The string definition is limited to 64 characters long. The symbol ? (3F in HEX) may be used to specify don't care positions within the character string.

=MASK **(string_address --)**
Specify a bit mask to be used with the string trigger. Any bits set to1 in the mask will be checked in the string compare. Any bits set to 0 in the mask will specify don't care positions within the string. The mask is entered in the format:

```
X" 03FF00FF" =MASK.
```

This would specify to check the 2 low bits of the first byte, all bits of the second byte, no bits of the third byte, and all bits of the fourth byte. If the trigger string is longer than the mask, the extra bytes in the string will be used as exact compares. Use 0 =MASK to cancel a MASK entry.

+STRING **(--)**
The string trigger will be added to the trigger events. The characters last defined using =STRING for the active trigger will be used for the string match comparison.

-STRING **(--)**
The string trigger will be deleted from the trigger events.

The following commands are used to set up the time trigger:

=TIME **(year / month / day / hour / minute --)**
Event trigger at the selected time (real time). The time must be entered in front of the =TIME in the format:

```
Year Month Day Hour Minute =TIME
```

+TIME **(--)**
The time trigger previously set with =TIME will be added to the trigger events.

-TIME **(--)**
The time trigger will be deleted from the trigger events.

The lead transition trigger will detect an ON or OFF transition of the interface control leads and ensure this lead; then remains stable for a timed interface before executing the trigger action. The following commands are used to set up the lead transition trigger: (*)

=TRANSITION **(value --)**
Set the time value in milliseconds to be used for the lead transition trigger.

+TRANSITION **(--)**
The lead transition selection is added to the trigger events.

-TRANSITION **(--)**
The lead transition is deleted from the trigger events.

The following commands are used to select which interface control leads are to be used in the lead transition trigger. (*)

RTS=ON	RTS=OFF	CTS=ON	CTS=OFF
DSR=ON	DSR=OFF	CD=ON	CD=OFF
DTR=ON	DTR=OFF	SQ=ON	SQ=OFF
RI=ON	RI=OFF		

The storage trigger detect when disk or capture ram is full. This is used with the **DISK_FULL** or **CAPT_FULL** setting.

+DISK_FULL **(--)**
Add disk full condition to the trigger events.

-DISK_FULL **(--)**
Delete disk full condition from the trigger events.

+CAPT_FULL **(--)**
Add capture ram full condition to the trigger events.

-CAPT_FULL **(--)**
Delete capture ram full condition from the trigger events.

* only available on K1197 with V/X interface

INTERFACE LEAD EVENTS

+/-RTS_ON	RTS lead going on is added/deleted to the trigger events
+/-RTS_OFF	RTS lead going off is added/deleted to the trigger events
+/-CTS_ON	CTS lead going on is added/deleted to the trigger events
+/-CTS_OFF	CTS lead going off is added/deleted to the trigger events
+/-DSR_ON	DSR lead going on is added/deleted to the trigger events
+/-DSR_OFF	DSR lead going off is added/deleted to the trigger events
+/-CD_ON	CD lead going on is added/deleted to the trigger events
+/-CD_OFF	CD lead going off is added/deleted to the trigger events
+/-DTR_ON	DTR lead going on is added/deleted to the trigger events
+/-DTR_OFF	DTR lead going off is added/deleted to the trigger events
+/-SQ_ON	SQ lead going on is added/deleted to the trigger events
+/-SQ_OFF	SQ lead going off is added/deleted to the trigger events
+/-RI_ON	RI lead going on is added/deleted to the trigger events
+/-RI_OFF	RI lead going off is added/deleted to the trigger events

Note: Interface Lead Trigger are only available on K1197 with V/X interface.

DEFINING TRIGGER ACTIONS

Trigger actions are defined using the 'MAKE' word. The form used is:

```
MAKE  TA1  ENB_REC  BEEP ;
MAKE  TA2  REP_ON ;
MAKE  TA3  CAPT_ON ;
MAKE  TA4  DIS_REC  REP_OFF  CAPT_OFF ;
```

When the trigger event is found, the action that has been defined for this trigger will be executed. The actions can be any of the commands of the analysis package or FORTH words that have been defined by the user with : and ;. In the example above, trigger 1 action has been defined as ENB_REC (Enable disk recording) and BEEP (beep the sonalert).

Note: The MAKE actions definition must always end with a semicolon (;).
See also: "Make and doer constuct" in the FORTH Programming Manual

HIGHLIGHT (--)
The HIGHLIGHT command will cause the received report display for the trigger event to be highlighted.

HIGHLIGHT=RED (--)
The HIGHLIGHT=RED command will set the color used for the **HIGHLIGHT** command to be a red background.

HIGHLIGHT=BLUE (--)
The HIGHLIGHT=BLUE command will set the color used for the **HIGHLIGHT** command to be a blue background.

2.3.7 INTERFACE TYPE SELECTION (*)

There are two configurations on the V/X interface connector module on the K1197. One type has V.28 (RS232-C), V.35 and V.11 (X.21) interfaces, and the other type of connector module has V.28 (RS232-C), V.36 and V.11 (X.21) interfaces. To select the desired interface, the following commands can be used:

IF=V11 – Selects the V.11 (X.21) interface connector.

IF=V28 – Selects the V.28 (RS232-C) interface connector.

IF=V35 – Selects the V.35 interface connector.

IF=V36 – Selects the V.36 interface connector.

* only available on K1197 with V/X interface

2.4 REPORT DISPLAY

The report display on the screen is generated by the Report Generator module. The Report Generator module obtains the data from the Report Filter and creates a report according to the user selected format for display. The user can select the source of data to be generated.

The report display can be turned on or off by the commands **REP_ON** or **REP_OFF** respectively.

This section describes, in detail, the format and function of the report display.

All the commands that are related to report display are described in Section 2.3.2.

2.4.1 SELECT THE SOURCE OF REPORT DISPLAY

It is possible to display live data, data from capture ram, or data file on disk, depending on the Monitor state.

In MONITOR state, the live data is automatically selected to be the source of the report display and the user is not allowed to change this selection.

In FREEZE or HALT state, only the capture ram or data file on disk can be selected to be the source of the report display.

Refer to Section 2.1 for the procedures to select the monitor state and the source of data.

2.4.2 REPORT FORMATS

There are three types of report formats: short report (REP_SHORT), hex report (REP_HEX) and character report (REP_CHAR). The character set may be set to ASCII, EBCDIC, HEX, TELETEX or JIS8

Short report is a condensed report which is suitable for high speed application. A split screen display can be selected in short report format to divide the frames originated from one end to another.

Hex or Character Report will display the received frame number, the direction and the data received on, and will dump the entire frame on the screen in hex or characters, respectively

2.4.2.1 SHORT REPORT

The short report will display in a condensed format, the interface port the data was received on, the address, the length and data. This report is limited to one line per frame. The short report is useful for higher speed monitoring because more frames per screen may be displayed than with any other report formats, and processing time is kept to a minimum.

Figure 2-4 shows an example of reporting USM data with short report and no split screen format. Figure 2-5 shows the short report with split screen format.

```
REPORT DISPLAY WITH REP_SHORT

BLOCK NUMBER        ORIG      LENGTH    DATA

1                   DTE       140       The UNIVER

1                   DCE       188       The MONITO

2                   DTE       186       The displa

2                   DCE       112       The inform

3                   DTE        85       The inform

3                   DCE       102       There are

>
```

Figure 2-4: Report short

```
BLOCK NUMBER  ORIG   LENGTH  DATA        |BLOCK NUMBER ORIG   LENGTH DATA

12693         DCE    9       CPU1 DATA   |  12598      DTE    9      CPU3 DATA

12694         DCE    9       CPU1 DATA   |  12599      DTE    9      CPU3 DATA

12695         DCE    9       CPU1 DATA   |  12600      DTE    9      CPU3 DATA

12696         DCE    9       CPU1 DATA   |  12601      DTE    9      CPU3 DATA

12697         DCE    9       CPU1 DATA   |  12602      DTE    9      CPU3 DATA

12698         DCE    9       CPU1 DATA   |  12603      DTE    9      CPU3 DATA

12699         DCE    9       CPU1 DATA   |  12604      DTE    9      CPU3 DATA

12700         DCE    9       CPU1 DATA   |  12605      DTE    9      CPU3 DATA
```

Figure 2-5: Report short with splitted screen

2.4.2.2 HEX REPORT

The Hex Report will display the received frame number, the direction and the data was received on, and will dump the entire frame to the screen in HEX format.

REPORT DISPLAY WITH REP_HEX AND TIME_OFF

```
BLOCK NUMBER ORIG          HEX DISPLAY OF FRAMES

1            DTE 54 68 65 20 55 4E 49 56 45 52 53 41 4C 20 4D 4F 4E 49 54 4F
                 52 2F 53 49 4D 55 4C 41 54 4F 52 20 69 73 20 69 6E 74 65 6E
                 64 65 64 20 74 6F 20 62 65 20 75 73 65 64 20 66 6F 72 20 74
                 65 73 74 69 6E 67 20 64 61 74 61 20 63 6F 6D 6D 75 6E 69 63
                 61 74 69 6F 6E 73 20 6C 69 6E 6B 73 20 74 68 61 74 20 75 73
                 65 20 42 4F 50 2C 20 43 4F 50 2C 20 61 6E 64 20 41 73 79 6E
                 63 68 72 6F 6E 6F 75
1            DCE 54 68 65 20 4D 4F 4E 49 54 4F 52 2F 53 49 4D 55 4C 41 54 4F
                 52 20 68 61 73 20 74 77 6F 20 6D 6F 64 65 73 2C 20 53 49 4D
                 55 4C 41 54 4F 52 20 61 6E 64 20 4D 4F 4E 49 54 4F 52 2E 20
                 49 6E 20 53 49 4D 55 4C 41 54 4F 52 20 6D 6F 64 65 2C 20 74
                 68 65 20 54 65 73 74 20 4D 61 6E 61 67 65 72 2F 4D 6F 6E 69
                 74 6F 72 20 63 61 6E 20 74 72 61 6E 73 6D 69 74 20 64 61 74
                 61 20 61 63 74 69 6E 67 20 61 73 20 44 54 45 20 6F 72 20 44
                 43 45 2E 20 49 6E 20 4D 4F 4E 49 54 4F 52 20 6D 6F 64 65 2C
                 20 6E 6F 74 68 69 6E 67 20 63 61 6E 20 62 65 20 74 72 61 6E
                 73 6D 69 74 74 65 64 2E
2            DTE 54 68 65 20 64 69 73 70 6C 61 79 20 6F 66 20 6C 69 76 65 20
                 64 61 74 61 20 61 6E 64 20 63 6F 6E 74 72 6F 6C 20 6C 65 61
                 64 20 63 68 61 6E 67 65 73 20 6D 61 79 20 62 65 20 72 65 70
                 6F 72 74 65 64 20 69 6E 20 73 65 76 65 72 61 6C 20 66 6F 72
                 6D 61 74 73 20 6F 6E 20 74 68 65 20 64 69 73 70 6C 61 79 20
                 73 63 72 65 65 6E 20 6F 72 20 70 72 69 6E 74 6F 75 74 2E 20
                 54 68 69 73 20 69 6E 66 6F 72 6D 61 74 69 6F 6E 20 6D 61 79
                 20 62 65 20 73 74 6F 72 65 64 20 69 6E 20 63 61 70 74 75 72
                 65 20 72 61 6D 20 6F 72 20 72 65 63 6F 72 64 65 64 20 6F 6E
                 20 64 69 73 6B 2E
2            DCE 54 68 65 20 69 6E 66 6F 72 6D 61 74 69 6F 6E 20 73 61 76 65
                 64 20 69 6E 20 74 68 65 20 6e 61 70 74 75 72 65 20 72 61 6D
                 20 63 61 6E 20 62 65 20 73 63 72 6F 6C 6C 65 64 20 74 6F 20
                 64 69 73 70 6C 61 79 20 6F 72 20 70 72 69 6E 74 6F 75 74 2C
                 20 61 6E 64 20 63 61 6E 20 62 65 20 74 72 61 6E 73 66 65 72
                 72 65 64 20 74 6F 20 64 69 73 6B 2E
```

2.4.2.3 CHARACTER REPORT

The charakter report will display the interface the data was received on, the received frame number, and will dump the entire frame to the screen in either ASCII, EBCDIC, HEX, TELETEX or JIS8 characters.

REPORT DISPLAY WITH REP_CHAR AND TIME_SEC

```
SS'mm''uuu   ORIG        CHARACTER DISPLAY OF FRAMES

50'15"804    DTE<The UNIVERSAL SIMULATOR/MONITOR is intended to be used for t>
               <esting data communications links that use BOP, COP, and Asyn>
               <chronous procedures.>

50'15"950    DCE<The SIMULATOR/MONITOR has two modes, SIMULATOR and MONITOR. >
               <In SIMULATOR mode, the Test Manager/Monitor can transmit dat>
               <a acting as DTE or DCE. In MONITOR mode, nothing can be tran>
               <smitted.>

50'16"147    DTE<The display of live data and control lead changes may be rep>
               <orted in several formats on the display screen or printout. >
               <This information may be stored in capture ram or recorded on>
               < disk.>

50'16"341    DCE<The information saved in the capture ram can be scrolled to >
               <display or printout, and can be transferred to disk.>

50'16"457    DTE<The information from the disk recording can be played back, >
               <displayed or printed out.>

50'16"546    DCE<There are triggers available so that only those events desir>
               <ed will be reported, captured or recorded.>
50'16"654
```

2.4.3 INTERFACE LEAD DISPLAY

On a K1197 with V/X interface the interface leads can be displayed on the screen by selecting the SEE_LEADS command. It displays the lead changes of both DTE and DCE interfaces on the status line (lines 2 and 3). There are a total of four possible interface types: V.28 (RS232-C), V.11 (X.21), V.36 and V.35. The following are examples of the display of different interface types.

```
P1:>|< WD4   ANALYZER    ASYNC     I/F = V.28 2400 B   16.07.1991 13:26:12
DTE  SD  1      RTS  1               DTR 0 DRS 0
DCE  RD  1      CTS  1 DSR 1 CD 1                SQ 1 RI 1
```

```
P1:>|< WD4   ANALYZER    ASYNC     I/F = V.11 2400 B   16.07.1991 13:26:48
DTE  T   1        C  1
DCE  R   1        I  1
```

```
P1:>|< WD4   ANALYZER    ASYNC     I/F = V.36 2400 B   16.07.1991 13:27:10
DTE  SD  1      RS   1               TR 1 SR 0          SS 0        LL 0
DCE  RD  1      CS   1 DM 1 RR 1                 SQ 1 IC 0
```

```
P1:>|< WD4   ANALYZER    ASYNC     I/F = V.35 2400 B   16.07.1991 13:27:00
DTE  SD  1      RTS  0               DTR 0
DCE  RD  1      CTS  1 DSR 1 CD 1                   RI 1
```

2.4.4 RECEIVER OVERFLOW

The Monitor system will produce an error message if data is received faster than can be processed. The report display will switch a faster display mode (REP_SHORT) or off (REP_OFF) when this happens. The shutdown of the display reports can be controlled with the commands **SHUTDOWN_ON** and **SHUTDOWN_OFF**. There will be some data lost at the time of a receiver overflow.

If live data is received faster than can be processed, a receiver overflow condition occurs. In this case, the Monitor will produce an error message and try to switch the report display to a faster mode using the following rule. If the current display format is REP_COMP, it will be switched to REP_SHORT, and if the current display format is already REP_SHORT, it will turn off the report (REP_OFF).

The receiver overflow error messages will be shown in the report display, stored in the capture ram, or recorded to the data file. The error message always indicated the effect of receiver overflow as:

`RECEIVER OVERFLOW` – Data Lost or

`RECEIVER OVERFLOW` – Lead Lost

It will also indicate the action being taken by:

`REPORT SHORT` or

`REPORT OFF` messages.

The following messages will be displayed, captured and recorded to disk if a receiver overflow occurs.

SHUTDOWN_ON – The report format will switch to REP_SHORT and REP_OFF if a receiver overflow occurs. This setting is the default condition.

SHUTDOWN_OFF – The report format will not change when a receiver overflow condition occurs.

To capture or record data at high speeds without receiver overflows, the user may select **FAST_MODE**. This mode will allow high speed recording, which can be analyzed by playback of the recorded file.

2.5 CAPTURE RAM

The K1197 system provides 64K on-board ram memory to store the live data. Live data may be saved in the ram during the MONITOR state, and the data can be retrieved in either FREEZE or HALT state.

Section 2.1 provides a detailed explanation of the procedures to capture or retrieve data from the capture ram. Section 2.3.3 describes the commands that are used to set up the capture ram.

When live data is going into the ram, the capturing process can be set to CAPT_WRAP, in which case live data is continuously being saved on the ram and the ram always contains the latest 64 Kbytes of live data. Another mode is CAPT_FULL, in which case, only 64 Kbytes of live data are saved, and then the capture process stops.

When retrieving on display, it can be scrolled forward or backward using the cursor keys on the keyboard or the scrolling commands described in Section 2.3.3.2. The data is stored in a bi-directional list with one frame per list element.

2.6 DISK OPERATION

It is possible to record data onto a file on the floppy disk (or on harddisk). The source of data can be the live data when in either MONITOR or FREEZE state, or from capture ram when in HALT state.

The maximum size of the data file is the size available on the disk. The user can select DISK_FULL, in which case, recording stops when the file is full, or DISK_WRAP, in which case, a continuous recording of the data.

Recording can be done by **START** recording in the data recording menu (or by the RECORD command) and playback is done by **EXECUTE** playback in the data playback menu or by the **PLAYBACK** command. If no parameter is given, the default filename is used, which is set by the **=TITLE** command

Data is retrieved using the **EXECUTE PLAYBACK** , scrolling control can be done by using the cursor keys.

Note: While data recording is being done on either CPU, the user must ensure that no other disk operations are attempted on that or any other CPU. This means that playback cannot be done while the other CPU is recording data. Also, the disk utilities, editor and directory functions on the Main CPU should not be used while any CPU is recording data.

2.6.1 MULTIPORT DATA RECORDING

Recording data from more than one application into the same data file can be done. The data filenames and disk drive specified must be the same on all applications where disk recording should be done. The procedure would be to create the data file on one application by **START** recording there. The data file will then contain the data from all applications where disk recording is active. The recording must be closed by **STOP** recording from the data recording menu (or doing DISK_OFF) in all applications.

Either application can be used to playback the file using the **PLAYBACK** command then using the cursor keys to scroll through the recorded data.

In the playback selection menu (or with the **PLAY_1**, **PLAY_2**, ... **PLAY_8** and **PLAY=ON** and **PLAY=OFF** commands), the viewing of each port's data can be controlled.

Notes: - Data recorded from the own CPU is displayed in green/white.

- Data recorded from other CPU's is diplayed in yellow/cyan.

- By default, only data recorded from own CPU will be displayed.

MULTIPORT PLAYBACK SELECTION

To see or suppress display of data recorded from other applications, enter the data playback selection menu and select the data which should be displayed.

Notes: - Display from Capture Ram uses the same mechanisms as Playback, be sure to have set **PLAY=ON** for your local application to see the contents of the Capture Ram.

- When data recorded from other applications is displayed error messages may be displayed (such as "INV" , "UNKNOWN" etc.), because the data may have been recorded from an application different from the application doing the playback.

2.6.2 DISK COMMANDS

RECORD (--)
Opens a data recording file on disk. Use the form RECORD <filename> to specify the filename of the recording file. Use the commands **DR0..WD7** prior to the RECORD command to select the disk drive/harddisk partition to be used for data recording.

PLAYBACK (--)
Opens an existing data file on the current disk for playback. Use the command PLAYBACK "FILENAME" to specify the playback file. The cursor keys can be used to scroll forward or backward through the playback file with the current selections of the report commands determining the display format.

=TITLE **(string address --)**
Set the filename used for data recording or playback.
Use in the form " ..." =TITLE.

DISK_OFF (--)
The current Disk recording or playback file is closed. This **must** be done to finish data recording.

ENB_REC (--)
Live data received is saved in a recording file when in Monitor or Freeze states and a data recording file is open.

DIS_REC (--)
Disable recording (suspend data recording procedure). Subsequent data is not saved on disk.

FROM_CAPT (--)
Capture RAM is selected as source of data when in HALT state.

FROM_DISK (--)
Disk playback file is selected as source of data when in HALT state.

FAST_MODE (--)
Select the fast disk recording mode (signalling traffic is directly dumped to the disk, not every signal unit is processed by the application, disk filters are not used, triggers are not applied onto every SU received).

NORM_MODE (--)
Select the standard mode of operation. Every signal unit is checked against the filters and triggers and may be processed by the test manager. **NORM_MODE** is the default setting.

2.7 THROUGHPUT MEASUREMENT

The Monitor provides a throughput measurement on the line utilization. The throughput measurement is done by counting the number of bits received in the pre-selected time interval and then average the result to obtain the throughput in bits per second. The measurement is then being shown both in bits per second and percentage of the line speed. Measurements are done for two independent time intervals: long time interval and short time interval. The long time interval measurement results can be printed to collect permanent results of the test. The data display area on the screen is compressed to 6 lines while the throughput graphs are being displayed. The Monitor must be in the MONITOR state for the throughput graph to be displayed.

2.7.1 COMMANDS FOR THROUGHPUT MEASUREMENT

The Monitor also supports a throughput measurement one the line utilization. The following commands are used to set up the throughput measurement:

TPR_ON	**(--)**	Throughput rate measurement and bar graph display on.
TPR_OFF	**(--)**	Throughput rate measurement display and printout disabled.
PRINT_TPR	**(--)**	Print and display throughput rate results. The results of the interval measurements only will be printed.
SET_SPEED	**9600**	Set the line speed to be used for the throughput calculations. In this example the speed is set to 9600 b/s.
SET_SHORT	**10**	Set the short time interval for measuring and displaying the results. In this example the time is set to 10 seconds.
SET_LONG	**600**	Set the long time interval for measuring, displaying, and printing throughput results. In this exampe the time is set to 600 seconds (10 minutes).

2.7.2 THROUGHPUT DISPLAY FORMAT

```
ANALYZE LINE THROUGHPUT SHORT INTERVAL = 10 SEC LONG INTERVAL = 60 SEC

DTE LONG      8620   B/S  .............
DTE SHORT    10200   B/S  .............
LINE =       56000   B/S  O %   | | | |  50%    | | | |    100%

DCE LONG     35408   B/S  .............
DCE SHORT    32650   B/S  .............
LINE =       56000   B/S  O %   | | | |  50%    | | | |    100%
```

The long interval bar graphs are displayed in cyan and the short interval bar graphs are displayed in green. If a calculation results in throughput, over 100 % of the entered line speed the bar graph will be displayed in red. This can happen when the time interval has been changed, or an incorrect line speed was entered.

2.7.3 THROUGHPUT PRINTOUT FORMAT

```
ANALYZE LINE THROUGHPUT SPEED = 9600 B/S  INTERVAL = 600 SECONDS

1991 07 18 12 05 56 DTE THROUGHPUT=784 B/S DCE THROUGHPUT=782 B/S
1991 07 18 12 15 56 DTE THROUGHPUT=9835 B/S DCE THROUGHPUT=42320 B/S
```

The printout gives the time as year, month, day, hour, minute and second. The long interval measurement results are printed for both DTE and DCE directions of the data.

2.8 SIMULATION

2.8.1 D-CHANNEL SETUP COMMANDS FOR K1197 WITH S0/S2M-INTERFACE

The following commands are only valid for using the USM together with a D-channel application.

ACTIVATE **(--)**
Activate the D-Channel Layer-1 connection for B-Channel purposes

DEACTIVATE **(--)**
Deactivate the D-Channel Layer-1 connection.

2.8.2 SEND COMMANDS

2.8.2.1 BUFFER

Up to 256 buffers can be created and used by the Test Manager. The buffers can be created any size desired, however the Universal Simulator/Monitor will not transmit more than 4170 bytes. The buffers are specifed by numbers 0 to 255. All buffers are cleared by the TCLR command.

BUFFER STRUCTURE

The buffer structure consists of 4 bytes with values of zero, 2 bytes containing the 16 bit length, followed by the text bytes.

BUFFER **(number -- addr of buffer)**
The BUFFER command is used to specify a buffer and will return its starting address. The buffer must have been created with FILE->BUFFER or STRING->BUFFER.
Format: `0 BUFFER`

STRING->BUFFER **(" string"/number --)**
The STRING->BUFFER command is used to load a quote string into the buffer specified. The length is limited to 80 bytes.
Format:
```
" TEXT STRING" 1 STRING->BUFFER
X" 0100100100434445" 2 STRING->BUFFER
```

FILE->BUFFER **(" filename"/number --)**
The FILE->BUFFER command is used to transfer a text file into the buffer specified. The file is transferred into the buffer until an ASCII CTRL P (displayed as a Red Pilcrow character) is found or the file is finished.
Format: `" FILENAME" 0 FILE->BUFFER`

2.8.2.2 FRAMES WITH LENGTH OVER 80 CHARACTERS

The frame is created in a file with the K1197 Editor. The string is terminated with a Control P character. Maximum length of frame transmitted is 4170 bytes.

For sending files use:

FILE->BUFFER	-Transfers file to a Buffer
SEND_BUFFER	-Sends above Buffer
SENDB	-Sends Buffer with n Bytes
SEND_BUFFER_ERROR	-Sends Buffer with CRC error

SEND_BUFFER **(number --)**

The user must first transfer a file to a Buffer using FILE->BUFFER. To transmit the Buffer the user would then use SEND_BUFFER.
The buffer number has to be in the range of 1-254.

Usage:
```
" Filename" 1 FILE->BUFFER
           1 SEND_BUFFER.
```

SENDB **(number/Byte / count ---)**

The user must first transfer a file to a Buffer using FILE->BUFFER. To transmit the Buffer the user would then use SENDB. The buffer number has to be in the range of 1-254.

Usage:
```
" Filename " 1 FILE->BUFER
             1 128 SENDB
```

SEND_BUFFER_ERROR **(number --)**

This command works in the same manner as SEND_BUFFER except that in BOP{HDLC/SDLC] and Bisync modes, it will transmit a CRC error and in ASYNC, a Parity error.

Usage:
```
" Filename" 2 FILE->BUFFER
           2 SEND_BUFFER_ERROR.
```

2.8.2.3 FRAMES WITH MAXIMUM LENGTH OF 80 CHARACTERS

There are five transmission commands:

" string" **SEND**	" string" **A_TO_E_SEND**
" string" **SEND_WITH_ERROR**	" string" **A_TO_E_SEND_WITH_ERROR**
" string" **SEND_WITH_ABORT**	

These can only be used in simulation mode and the data is always transmitted to the simulation partner, whether DTE or DCE. In BOP [HDLC/SDLC] and Bisync, a CRC is automatically sent by the K1197. A CRC in either ASYNC or COP must be calculated in software. When the **SEND_WITH_ERROR** command is used, a CRC error is transmitted in BOP [HDLC/SDLC] and BSC modes and a parity error in ASYNC.

The strings can be specified as either a Hex or ASCII character string. To create a Hex string, it should be preceded by an X as shown:

```
X" 1F3A0C4E6D"
```

The character string must specify the entire frame and is created as follows:

For BISYNC "TEXT STRING", it is necessary to include symbols for:

1. Start of Heading (Optional)
2. Start of Text
3. End of Text

as well as Actual Text.

Example:

" $^{S}_{H}$ GOODBYE $^{T}_{X}$ " or
" $^{S}_{X}$ HELLO $^{E}_{X}$ " or

These can be specified in your Test Manager script using the K1197 Editor in Literal Mode. Use function key Sf8 in the Editor and Select Literal.

CONTROL A will result in a Start of HEADER – $^{S}_{H}$
CONTROL B will result in a Start of TEXT – $^{S}_{X}$
CONTROL C will result in an END of TEXT – $^{E}_{X}$

These may also be created outside of the K1197 Editor by using the same CONTROL Characters as mentionned above when specifying character string.

SEND **(" string" --)**
This command will send the string to the simulation partner. In BOP[HDLC/SDLC] and either Bisync ASCII or Bisync EBCDIC, a CRC is automatically sent by the K1197. In either ASYNC or COP, the CRC must be calculated by software.
Format: `" TEXT STRING" SEND`
`X" IF3A0C4E6D" SEND`

SEND_WITH_ERROR **(" string" --)**
This command will send the string to the simulation partner with a CRC error. (Note: CRC error will not be transmitted in COP mode). A Parity error will be transmitted in ASYNC.
Format: `" TEXT STRING" SEND_WITH_ERROR`

SEND_WITH_ABORT **(" string" --)**
This command will send the string with an ABORT status.
Format: `" TEXT STRING" SEND_WITH_ABORT`

SEND_WITH_ABORT is useful when emulating BOP protocols. This command will begin sending text and after 5 characters, send an abort.

When sending frames, especially at low speed, it is sometimes useful to wait for the completion of the transmitted frame before continuing on with your program. To facilitate this, there is a flag named **TX-SEND-WAIT** which is examined whenever a **SEND, SEND_WITH_ERROR,** or **SEND_WITH_ABORT** is executed. If this variable contains a 1, the program will pause until the entire frame is transmitted. If the variable contains a 0, the frame will be queued for transmission and the program will continue.

A_TO_E_SEND and **A_TO_E_SEND_WITH_ERROR** are used in the same manner as **SEND** and **SEND_WTIH_ERROR** . However, they take an ASCII string, convert it to EBCDIC and if the conversion is successful, transmit the frame. If the conversion is unsuccessful, the frame will not be sent and a message will be displayed that the conversion was not successful.

Note: If these two commands are used in test script and the strings were created with the K1197 Editor using a character set that is not ASCII, the conversion attempt will still be made and if successful, the string sent will probably not be the one desired by the user.

Frames of maximum length of 80 characters may also be sent using the buffer structure by use of commad STRING->BUFFER and SEND_BUFFER

Method: `" TEXT STRING" 3 STRING->BUFFER`
`3 SEND_BUFFER or 3 6 SENDB`

3 TEST MANAGER

The USM Test Manager is used to execute a user-defined test scenario which may test the protocol and/or service conformance of an IUT (Implementation Under Test), or simply store or display the desired information of the monitored data. Typical information that might be stored and/or displayed includes throughput performance data and the occurence of a particular frame sequence. In order to set up a test scenario, a set of FORTH words is provided to assemble the test as a finite state machine.

The Test Manager can be invoked both by the Monitor and the Simulator. When it is invoked by the Monitor, it serves as an analytical tool which allows the user to collect specific data using a specified format on the desired device. When it is invoked by the Simulator, it not only has all the analytical power, but also the capability to send tailored frames to the test suite so that both protocol and service conformance of the test suite can be examined.

The Test Manager, when activated, will execute on top of the application program. The user can terminate the Test Manager at any time and resume the execution at any reasonable configuration. (For example, it is not reasonable to examine incoming frames when the monitor is in halt mode or to examine playback data when the monitor is reading data from buffer or disk. Such combinations are ignored by the Test Manager.)

It is assumed that users who want to program scenarios have an adequate background in the FORTH language. They should also refer to the FORTH Programming User Manual [3] for a description of the SIEMENS implementation of FORTH.

MONITOR

The Monitor Test Manager is capable of detecting all the frames and events being decoded by the analyzer. In addition, it also provides timers and counters for statistic functions. Since the Test Manager resides on top of the analyzer program, it can execute any commands that are defined by the analyzer or the system MENU.

SIMULATION

This section describes how the Test Manager supports the three protocol elements. In the following descriptions, the term frame is used for a block of incoming data. In BOP (Bit Oriented Procedure), this is a group of bytes surrounded by flags. In COP (Character Oriented Procedure), this is a group of characters preceded by one or more sync characters and terminated by the sync reset character or an idle line. In async, this is a group of contiguous characters.

3.1 FORMAT OF TEST MANAGER SCENARIOS

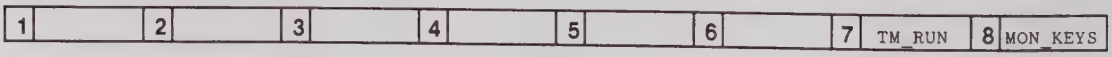
The Test Manager scenarios are organized into state machine format to allow for clearly defined test procedures. (The scenarios are assumed to be contained in a file. The user may refer the K1197 User Manual [1] for a description of the file system and the Editor.)
This format allows easy implementation of SDL Diagrams [3].

The following, outlines some of the characteristics of the state machines.

- There can be only one state in existence at any one time.
- A maximum of 256 states can be defined with state numbers of 0 to 255. States do not have to be defined in any particular order according to the state number. However, state 0 is always assumed to be the initial state upon the startup of the state machine.
- If a reference is made to a state that is not defined, the state machine will not realize the error and will attempt to enter that state. So, it is the user's responsibility to ensure that such a situation will not occur.
- FORTH words that are defined by the application package or the system MENU can be used within the state machine.
- Events that are detected in the current state will cause execution of the code defined in the corresponding STATE{...}STATE part. That means, if the event matches one of the event recognition words programmed in the "STATE" section, the corresponding ACTION{...}ACTION code is executed and entry to a new state may be done there if desired.
- Entry to a new state means loading a new current state, which is executed with the **next** event.

3.1.1 FUNCTION KEYS

The USM menus provide a capability for loading the Test Manager. A set of function keys is reserved for use with test manager scenarios. This function keys set is reached by pressing **f8** in the default function key line (labelled: "TM_KEYS"). They are initially displayed as follows:



To execute a test script file, use the editor to create a file containing the state definitions, then activate the menu system (**f1**), go to the TEST MANAGER menu, select the drive to load the file from, enter the file name, move the scroll bar to the field "LOAD TESTMANAGER" and press return.

To invoke the loaded test script, press control function key **f7** in the Test Manager function key set.

To stop the execution of a test script, press function key **f7** again (now labelled "TM_STOP"). This will terminate the Test Manager.

The function keys as well as most of the following commands apply to the currently active Test Manager, i.e. the actions are performed for the active Test Manager. Swicthing between Test Managers can be done by using the commands described in section 5.2.

3.2 TEST MANAGER COMMANDS AND WORDS

As mentioned above, the Test Manager resides on top of the application programs and the system MENU. Therefore, any commands or FORTH words that are defined in the application program or the system MENU may be used in the Test Manager. In addition, the Test Manager also provides commands and words for writing test scenarios.

This section provides a summary of the commands and words that are essential for developing test scenarios, and operating the Test Manager. The commands and words are grouped into Test Manager control commands and words, event recognition words, action words, display function, lapse timers, interval timers, counters and buffers.

3.2.1 CONTROL COMMANDS

The following commands are used to compile the test scenarios and to initialize, run and stop the state machine.

TM_RUN **(--)**
will start the state machine running at state 0. The "STATE_INIT" code for state 0 (if there is some) will be executed immediately. The events in state 0 will be checked and when any of them happen, the defined action will be executed.

TM_STOP **(--)**
will terminate the operation of the Test Manager state machine.

EXECTS **(filename address --)**
will load the specified disk file in the Test Manager dictionary. This file must be a compiled binary Test Manager dictionary which was saved with the **SAVETS** command. The previous Test Manager dictionary will be overwritten. The command also verifies that the operating system and application software presently in the K1197 are compatible with the one used to compile and save the dictionary.

Usage: `" Filename" EXECTS`

SAVETS **(filename address --)**
will save the presently compiled Test Manager dictionary as a disk file using the specified filename. This file would be reloaded using **EXECTS.**

Usage: `" Filename" SAVETS`

EXECF **(filename address --)**
will load and compile files. It will use **EXEC** to compile source files or **EXECTS** to load the Test Manager dictionary which had been saved with **SAVETS**.

Usage: `" Filename" EXECF`

Where filename is the desired file to be loaded and compiled.

NEW_TM **(filename address --)**
will do an EXECF to load and compile the specified file, then will execute **TM_RUN** to start the Test Manager for the new scenario running at State 0. The NEW_TM command can be included as an action of one scenario to load and execute the next scenario. The calling Testscenario is immediately terminated when calling NEW_TM.

Usage: `"Filename" NEW_TM`

Note: NEW_TM must not be called outside the Test Manager
(i.e. other than outside an ACTION{ }ACTION)

TCLR **(--)**
will initialize the state machine data structure. Any existing Test Senario will be cleared. The current state is set to 0.

TM.RAM **(--)**
will display, on the command line, the memory usage of the Test Manager.

```
Test Manager Dictionary Used=0
    Free=27136 Largest File=52 Blocks
```

WAKEUP_ON **(--)**
will set a status that indicates that a special Timer is to be started for 100 Milliseconds when the **TM_RUN** is executed. The **?WAKEUP** event then will happen in State 0 and will start the Scenario execution.

WAKEUP_OFF **(--)**
will deselect the wakeup timer for **TM_RUN**.

The following FORTH words are used to create state machine in test scenarios for the Test Manager:

STATE{ **(state number --)**
}STATE **(--)**
The **STATE{ }STATE** words bracket the definition of a single state within a state machine. STATE{ expects a single integer which is the state number. If two states are defined with the same number, the second definition is used with no error messages.

ACTION{ **(truth flag --)**
}ACTION **(--)**
The **ACTION{ }ACTION** words bracket the FORTH code to be executed if the associated event occurs. ACTION{ expects a truth flag on the stack. If the truth flag is non-zero, the action list inside ACTION{ }ACTION is performed. If the truth flag was zero, the next event is checked. The events are defined by FORTH code that returns a flag to be used by the ACTION{ word. If the present event comparison results in a false condition (0), the next event is compared against the received event. There are high level words provided to perform the event comparisons needed. eg. ?FK_1, ? TIMER

LOAD_RETURN_STATE **(--)**
Save the state number of the state to which control is to be returned to. No nesting is allowed. This is used in conjunction with the **RETURN_STATE** command.

RETURN_STATE **(--)**
Return to the state with the state number that is saved by the **LOAD_RETURN_STATE** command.

NEW_STATE **(state number --)**
Expects a single integer and performs a change of state. NEW_STATE is only legal within an ACTION{ }ACTION pair. Another way to change the state is to modify the contents of the variable that contains the state. Thus 1 NSTATE ! does the same thing as 1 NEW_STATE.

LOAD_RETURN_STATE together with **RETURN_STATE** permits the user to program the equivalent of subroutine calls into the state machine. The procedure is as follows:

1. Load the state number of the state to which control is to be returned:

   ```
   X LOAD_RETURN_STATE
   ```

2. Load the subroutine state value using: `X NEW_STATE`.
3. At the end of each subroutine's "ACTION" parts you want to return execute: **RETURN_STATE.** If you want to return even if no event matches in the "subroutine", execute `RETURN_STATE` at the end of the subroutine's state too (prior }STATE).

Note: Nesting is not permitted, only one level is supported at this time.

STATE_INIT{
}STATE_INIT

(state number --)
(--)
The **STATE_INIT{...}STATE_INIT** words bracket the definition of a sequence of FORTH words that are to be executed upon entry to the specified state. The STATE_INIT{ expects a single integer which is the state number. The STATE_INIT{ ... }STATE_INIT procedure may be used for any defined state but is not compulsory. Execution of the "STATE_INIT" code is done upon startup of a Testscenario (for state 0) and by changing the state with NEW_STATE.

SEQ{
}SEQ

(sequence number --)
(--)
The **SEQ{ }SEQ** words bracket the definition of a sequence of FORTH words which are to be executed as part of the state machine action. SEQ{ expects a single integer which is the sequence number. Up to 256 action sequences are supported with sequence numbers from 0 to 255.

RUN_SEQ

(sequence number --)
Is used inside of an action to execute the specified sequence of FORTH words. RUN_SEQ expects a single integer which is the sequence number.

3.2.2 EVENTS

The actual decoded event value will be found in the variable EVENT-TYPE and the user may wish to display it by using **EVENT-TYPE ?** . The event types are identified by the constants FRAME, TIME*OUT, FUNCTION*KEY, and LEAD*CHANGE. When EVENT-TYPE contains TIME*OUT, the timer identification will be in the variable TIMER-NUMBER. When EVENT-TYPE contains FUNCTION*KEY, the key value will be in the variable KEY-NUMBER. When EVENT-TYPE contains LEAD*CHANGE, the lead identifier will be in variable LEAD-NUMBER and the lead on/off status will be in LEAD-STATUS.

3.2.2.1 RECOGNIZING FRAMES

There are three different frame recognition commands:

' frame' **?RECEIVED_DTE** – data received from the DTE
' frame' **?RECEIVED_DCE** – data received from the DCE
' frame' **?RECEIVED** – data received from the simulation partner

?RECEIVED_DTE and **?RECEIVED_DCE** are for use in monitor mode and **?RECEIVED** is for use in the emulation mode. Ensure that a space is inserted before the first character.

The frames can be specified as either a Hex or ASCII character string. To use a Hex string it should be preceded by an X as shown:

```
X" 1F3A0C4E6D" ?RECEIVED
X" 1F3A0C4E6D" ?RECEIVED_DTE
X" 1F3A0C4E6D" ?RECEIVED_DCE
```

The character string should specify enough of the frame, starting at the beginning, to uniquely identify it. A **?** (question mark) may be entered for a "don't care" character.

The maximum string length is 80 characters.

Note: These three words look for a matching string at the first of the frame. To search for a matching string anywhere in the frame, the following three words are used:

?SEARCH – Data received from Simulation Partner

?SEARCH_DTE – Data received from DTE

?SEARCH_DCE – Data received from DCE

The K1197 Editor can be used to specify the character set desired for the frame to be sent or received. Use function key sf7 in the Editor. The following character sets are available – ASCII, EBCDIC, HEX, TELETEX, JIS 8

Example:

To search for the string " HELLO" in a Test Manager script, set character set to ASCII and type " (Quote Space). Then choose desired character set, example EBCDIC, type HELLO. Change back to ASCII character set to close the quote and type " ?SEARCH.

In this example then, the search would be for an EBCDIC HELLO.

See file USM_BSC_E.T

WILD CARD CHARACTER

The wild card character "?" matches any single character in a search string. For example: ?B? matches ABC, XBX, BBB, etc.

3.2.2.2 ?ABORT

The **?ABORT** word is used within the event field to detect an aborted HDLC/SDLC frame.

Usage: ?ABORT

Example:

```
5 STATE{  ?ABORT
          ACTION{
                 ." Abort received"
          }ACTION
}STATE
```

3.2.2.3 ?CRC_ERROR

The **?CRC_ERROR** word is used within the event field to detect a CRC error. (HDLC/SDLC/COP/BSC_EBCDIC)

Usage: ?CRC_ERROR

Example:

```
6 STATE{  ?CRC_ERROR
          ACTION{
                 ." CRC Error received"
          }ACTION
}STATE
```

3.2.2.4 ?TIMER

The **?TIMER** word is used in the event field when an individual timer event is desired. ?TIMER expects an integer value that will be used as the timer's identifier.

Usage: `TIMER-NUMBER ?TIMER`

Where TIMER-NUMBER is the number of the timer (started with START_TIMER).

Example:

```
8 STATE{  21 ?TIMER
          ACTION{
                 ." Timer 21 expired"
          }ACTION
}STATE
```

3.2.2.5 ?WAKEUP

The **?WAKEUP** word is used within the event field to detect the wakeup timer, Timer 34.

Usage: `?WAKEUP`

Example:

```
9 STATE{  ?WAKEUP
          ACTION{
                 ." Timer 34 expired"
          }ACTION
}STATE
```

3.2.2.6 ?KEY

The **?KEY** word is used within the event field to detect function or cursor keys. ?KEY expects the constant value identifying the key. These values are listed under **EXTRACT_KEY** in the FORTH PROGRAMMING User Manual.

Usage: `KEY-IDENTIFIER ?KEY`

Where KEY-IDENTIFIER is the key identifier (see the list under EXTRACT_KEY in the FORTH PROGRAMMING User Manual).

Example:

```
10 STATE{ CHOME ?KEY
          ACTION{
                 ." HOME key pushed"
          }ACTION
}STATE
```

3.2.2.7 ?FK_1..?FK_6

Six function keys have been made available for assignment by the user. The words that can be used in place of ?KEY within the event field are:

?FK_1	– Detects function key f1
?FK_2	– Detects function key f2
?FK_3	– Detects function key f3
?FK_4	– Detects function key f4
?FK_5	– Detects function key f5
?FK_6	– Detects function key f6

Example:

```
9 STATE{  ?FK_1
          ACTION{
                 ." f1 key pressed"
          }ACTION
}STATE
```

3.2.2.8 ?KEYBOARD

The Test Manager event word **?KEYBOARD** has been added to allow for entry of character strings or numerical values into the Test Manager states. States which contain **?KEYBOARD** will stop processing of keyboard entries by the FORTH interpreter and will pass the character string to the Test Manager action instead. The **?KEYBOARD** word will return a flag of 1 when it detects keyboard entry terminated with the return key. The character string can be accessed in the action by using HERE to get the address of the character string. The length of the string will be in the first byte. The word **EXPECT_NUM** can be used to convert the character entry into a numerical value. **EXPECT_NUM** will return the value and a flag on the stack. The flag will be 1 if the number conversion was valid and will be 0 if the entry could not be converted to a numerical value.

Format: ?KEYBOARD

Example 1: (Usage for character string entry)

```
1 STATE{  ?KEYBOARD            ( check for keyboard entry )
          ACTION{
                 HERE          ( get address of string )
                  COUNT TYPE   ( this example will display it )
          }ACTION
}STATE
```

Example 2: (Usage for numerical value entry)

```
2 STATE{  ?KEYBOARD
          ACTION{
                 EXPECT_NUM              ( get value and flag on stack )
                  IF
                      ." value = " .     ( display value )
                  ELSE
                      DROP ." Invalid entry"
                  THEN
          }ACTION
}STATE
```

3.2.2.9 LEAD RECOGNITION*

The following commands detect interface Lead changes.

?RTS_ON	?RTS_OFF	?CTS_ON	?CTS_OFF
?DSR_ON	?DSR_OFF	?CD_ON	?CD_OFF
?DTR_ON	?DTR_OFF	?SQ_ON	?SQ_OFF
?RI_ON	?RI_OFF	?DRS_ON	?DRS_OFF
?IC_ON	?IC_OFF	?I_ON	?I_OFF
?C_ON	?C_OFF?	RTS_ON	?RTS_OFF
?CTS_ON	?CTS_OFF	?DSR_ON	?DSR_OFF
?CD_ON	?CD_OFF	?DTR_ON	?DTR_OFF
?RI_ON	?RI_OFF	?RS_ON	?RS_OFF
?CS_ON	?CS_OFF	?DM_ON	?DM_OFF
?RR_ON	?RR_OFF	?TR_ON	?TR_OFF
?SR_ON	?SR_OFF	?SQ_ON	?SQ_OFF
?IC_ON	?IC_OFF	?SS_ON	?SS_OFF
?LL_ON	?LL_OFF		

3.2.2.10 OTHER_EVENT

The **OTHER_EVENT** word will return a true (1) flag that can be used in the event field to always execute the actions. This can be used to detect any event which has not been explicitly programmed into an event field. The actual decoded event value will be found in the variable **EVENT_TYPE** and the user may wish to display it by using EVENT-TYPE ?. The event types are identified by the constants **FRAME**, **TIME*OUT**, **FUNCTION*KEY** and **LEAD*CHANGE**.

When EVENT-TYPE contains FRAME, the protocol events will be in the variables **FRAME-TYPE** and **PACKET-TYPE**. When EVENT-TYPE contains TIME*OUT, the timer identification will be in the variable **TIMER-NUMBER**. When EVENT-TYPE contains FUNCTION*KEY, the key value will be in the variable **KEY-NUMBER**. When EVENT-TYPE contains LEAD*CHANGE, the lead identifier will be in variable **LEAD-NUMBER** and the lead on/off status will be in **LEAD-STATUS**.

Note: **OTHER_EVENT** must be the last event detection in the STATE{...}STATE.

* only available for V/X interfaces

3.2.3 LEAD SETTING

The following commands set leads high or low for a V.28/RS-232 Interface:

RTS_ON	RTS_OFF
CTS_ON	CTS_OFF
DSR_ON	DSR_OFF
CD_ON	CD_OFF
DTR_ON	DTR_OFF
SQ_ON	SQ_OFF
RI_ON	RI_OFF
DRS_ON	DRS_OFF

The following commmands set leads high or low for a V.11 Interface:

IC_ON	IC_OFF
I_ON	I_OFF
C_ON	C_OFF

The following commands set leads high or low for a V.35 Interface:

RTS_ON	RTS_OFF
CTS_ON	CTS_OFF
DSR_ON	DSR_OFF
CD_ON	CD_OFF
DTR_ON	DTR_OFF
RI_ON	RI_OFF

The following commands set leads high or low for a V.36 Interface:

RS_ON	RS_OFF
CS_ON	CS_OFF
DM_ON	DM_OFF
RR_ON	RR_OFF
TR_ON	TR_OFF
SR_ON	SR_OFF
SQ_ON	SQ_OFF
IC_ON	IC_OFF
SS_ON	SS_OFF
LL_ON	LL_OFF

* only available for V/X interfaces

3.2.4 DESIGNING A CUSTOM EVENT MATCH

This example utilizes the flag **?RX-REPEAT** and would do a decode and/or display the first time a FRAME event type is encountered within a state. This permits multiple event evaluations within the same state, without doing the decode and/or display, more than once.

DO_DECODE would be a user defined word that would take advantage of the variables **REC-POINTER** and **REC-LENGTH** .

```
:?RX ( FRAME TYPE--flag )          ( Flag is 1 for a match
                                       0 for no match or event
                                       type other than a FRAME )
     EVENT-TYPE @ FRAME =
     IF
       ?RX-REPEAT @ 0=
       IF
            DO_DECODE              ( User defined word that would decode
                                     and/or display frame leaving FRAME
                                     TYPE in user defined variable
                                     FRAME-ID )
            1 ?RX-REPEAT !         ( Mark that decoding is done )
       THEN
       FRAME-ID @ =                ( Compares the result of DO_DECODE
     ELSE                            with the frame type left on stack )
       DROP 0
     THEN
;
```

3.2.5 LAPSE TIMERS

There are 256 interval timers that can be started and read at any time.

START_LAPSE_TIMER **({0..255} --)**
This command starts the specified timer.

MINUTES_ELAPSED **({0..255} -- minutes)**
This command will check the specified timer and return the number of minutes elapsed since the timer was started.

SECONDS_ELAPSED **({0..255} -- seconds)**
This command will check the specified timer and return the number of seconds elapsed since the timer was started.

MILLISECONDS_ELAPSED **({0..255} -- milliseconds)**
This command will check the specified timer and return the number of milliseconds elapsed since the timer was started.

3.2.6 INTERVAL TIMERS

There are 125 interval timers available in the system with numbering from 1 to 125. The timer assignment is as follows:

TIMER #	PURPOSE
1–24	Available to user
25–33	Reserved
34	Test Manager Wakeup Timer
35–63	Reserved
64–125	Available for the user

START_TIMER **(timer_id / value --)**
The timers are started by specifying the timer_id and the timeout interval in tenths of seconds.

Example: `1 300 START_TIMER` – will start timer 1 for 30 seconds.

STOP_TIMER **(timer_id --)**
Stops the specified timer for the currently active Test Manager

Example: `90 STOP_TIMER` – will stop timer 90.

3.2.7 COUNTERS

There are 128 counters defined in the Test Manager, named COUNTER1 to COUNTER128.

Use COUNTER1 @ to **fetch** a value from a counter.

Use 1 COUNTER1 ! to **save** a value in a counter.

Use 1 COUNTER1 +! to **increment** the counter.

3.2.8 MAIL COMMAND TO OTHER CPU

MAIL_CMD **(parm1 / parmx / # of parms --)**

This command will accept a parameter list with a count of the number of parameters on the top of the stack. The MAIL_CMD command will check which front end processor it is currentlyon, and send the mail to the other front end processor. Typical usage would be to have the top stack entry indicate the number of entries, the second entry as a command constant, and subsequent entries as arguments to the command. MAIL_CMD will buy a buffer, and mail this buffer to the other front end processor.

?MAIL **(-- flag)**

This command will return a flag YES | NO (1 | 0) if mail has been received from another processor. Each processor has the ability to send mail to another processor by using the command MAIL_CMD. When this mail is received by the destination processor, ?MAIL will return true and any subsequent ACTION{ }ACTION will be exeucted. These actions would include an EXTRACT_FTH_DATA command which will return the number of parameters and the mailed parameters on the stack. The Test Manager script is responsible for decoding the mailed message past this point.

Example: Scenario using MAIL_CMD and ?MAIL

```
TCLR
#IFNOTDEF PRINT_PARMS              ( If PRINT_PARMS isn't already defined )
     1 CONSTANT PRINT_PARMS        ( Define it)
#ENDIF
0 STATE{  UF1 ?KEY  ACTION{   1 2 3 4              ( Put arguments on stack )
                              PRINT_PARMS          ( Followed by command and )
                              5                    ( number of stack entries )
                              MAIL_CMD             ( Mail to other cpu )
                    }ACTION
          ?MAIL     ACTION{   EXTRACT_FTH_DATA     ( Set parms on stack )
                              >R                   ( Save parm count )
                              DOCASE               ( Find command )
                                   CASE PRINT_PARMS     ( PRINT_PARM command )
                                   { ." THE PARMS ARE "      ( Print message )
                                     R> 1 - 0                ( Get parm count )
                                     DO .                    ( Print parms )
                                     LOOP                    ( until done )
                                   }
                                   CASE DUP             ( Command not found, )
                                   { R> 1 -             ( get count )
                                     ?DUP               ( Duplicate if not 0 )
                                     IF
                                        0 DO
                                             DROP       ( Drop all parms )
                                        LOOP
                                     THEN
                                   }
                              ENDCASE
                    }ACTION
}STATE
```

3.2.9 DISPLAY FUNCTIONS

This section describes the commands and words for display comments, prompts, traces, etc. on the screen.

The following commands are used for controlling display in the User Display Window (row 3–16).

COMMANDS

W. **(value --)**
Displays as a number, the top value on the stack.

W.H **(value --)**
Displays as a hex number, the top value on the stack.

WCR **(--)**
Executes a newline in the window.

W." string" **(--)**
Displays a string.

PAINT **(color --)**
Paints the entire window the selected color. This command expects a color attribute value on the stack. The color selections are:

WHI_FG	(-- color)	White Foreground
GRN_FG	(-- color)	Green Foreground
YEL_FG	(-- color)	Yellow Foreground
CYA_FG	(-- color)	Cyan Foreground
BLU_BG	(-- color)	Blue Background
RED_BG	(-- color)	Red Background
MAG_BG	(-- color)	Magenta Background
BLK_BG	(-- color)	Black Background
REV_VIDEO	(--)	Reverse Video

CLEAR_TEXT **(--)**
Clears all text from the screen.
Note that any colors used will still remain so that CLEAR_TEXT is often followed by WHI_FG PAINT.

THERE **(row / col --)**
Moves the output cursor to the row and column specified. To move the cursor to row 3, column 0, enter: `3 0 THERE`

WHERE **(-- row / col)**
Returns the row and column position of the cursor.

CLEAR_ROW **(row --)**
Clears the row specified. To clear the first line, enter: `0 CLEAR_ROW`

3.2.9.1 COMMAND LINE DISPLAY

DISPLAY **(addr / attr --)**

This word permits users to output display in the command window.

Format: `" TEXT STRING" attribute DISPLAY`

Where the text string must be entered between two quote symbols. Note that a space character must follow the first quote. Attr may be one or a combination (via the OR or + operators) of the colors described above (refer to the explanation of PAINT).

The normal display words from FORTH can be used to generate display in the command window too (see the K1197 FORTH Programming User Manual [2]).

3.2.9.2 STATUS LINE DISPLAY

The user can control the display to the Status Window (lines 2 and 3 of the screen display). This can be done by using the following procedure.

```
0 HEADER-STATE !                    ( Turn status display off )
SL-WINDOW @ POP_WINDOW              ( Open and display user status lines )
CLEAR_TEXT                          ( Clear text from window )
WHI_FG PAINT                        ( Clear color from window )
0 10 THERE                          ( Position in status window )
W." Display in status window"       ( Display text in status window )
CLOSE_WINDOW                        ( Close status window )
```

The normal display of the status lines can be restored with the commands SEE_CONF or SEE_LEADS.

3.2.9.3 TRACE REPORT COMMANDS

Trace reports can be created and displayed together with the protocol report lines. These trace reports can also be saved in capture ram and in disk recordings. The words that are used for creating and displaying trace reports are: TEMIT, T.TYPE, T." ", T., T.H, TCOLOR, TCR.

TEMIT **(value --)**
Will insert the character value passed to it on the FORTH stack into the current position of the trace report buffer. The TEMIT operates for the trace reports like EMIT does for command lines.

T.TYPE **(addr / count --)**
Will insert the character string starting at address with a length of count into the current position of the trace report buffer. The T.TYPE operates for trace reports like TYPE does for command lines.

." **(--)**
Command input lines. (No Dual Display)

T." **(--)**
Inserts a character string into the trace report buffer. T." is used in the form: `T." text string"` where, the terminating delimiter is a " (quote). The T." operates for trace reports like ." does for command lines.
Live data window and capture buffer. (For Dual Display)

T. **(value --)**
Performs a binary to ASCII conversion on the value that is on the FORTH stack and inserts the result followed by one space into the trace report buffer. BASE is used to determine the number base for the conversion with decimal being the default. The T. operates for trace reports like. does for command lines.

T.H **(value --)**
Performs a binary to ASCII conversion using hex base on the value that is on the FORTH stack and inserts the result followed by one space into the trace report buffer. The T.H operates for trace reports like .H does for command lines.

TCR **(--)**
Performs a Carriage Return for the trace report. The display of the trace is done when the TCR is executed. The TCR operates for trace reports like the CR does for command lines.

TCOLOR **(color --)**
Allows changing of the color of the trace report lines. The colors that can be used are the same as described in Section 5.2.10.

RTRACE **({YES|NO} --)**
Selects report trace display on (YES RTRACE) or off (NO RTRACE).

CTRACE **({YES|NO} --)**
Selects capture trace on (YES CTRACE) or off (NO CTRACE).

DTRACE **({YES|NO} --)**
Selects disk recording trace on (YES DTRACE) or off (NO DTRACE).

STATE-TRACE **(-- addr)**
The variable STATE-TRACE controls, whether state transition will be reported (1) or not (0).

3.3 LIST OF COMMUNICATION VARIABLES

PORT-ID **(-- addr)** Variable
Identifier of receive direction.
TO_DTE_RX - Received from DTE (terminal)
TO_DCE_RX - Received from DCE (modem)

REC-LENGTH **(-- addr)** Variable
Length of received frame

REC-POINTER **(-- addr)** Variable
Pointer to received frame

REC-STATUS **(-- addr)** Variable
Received frame status byte

START-TIME **(-- addr)** Variable
Pointer to 48 bit timestamp for the start of the frame time.

END-TIME **(-- addr)** Variable
Pointer to 48 bit timestamp for the end of the frame time.

?RX-REPEAT **(-- addr)** Variable
Is set to zero each time a frame is decoded, before the Test Manager is run.

3.4 TEST MANAGER SCENARIO EXAMPLES

3.4.1 USM_TEST 1

EXECUTION FLOW CONTROL IN THE TEST MANAGER

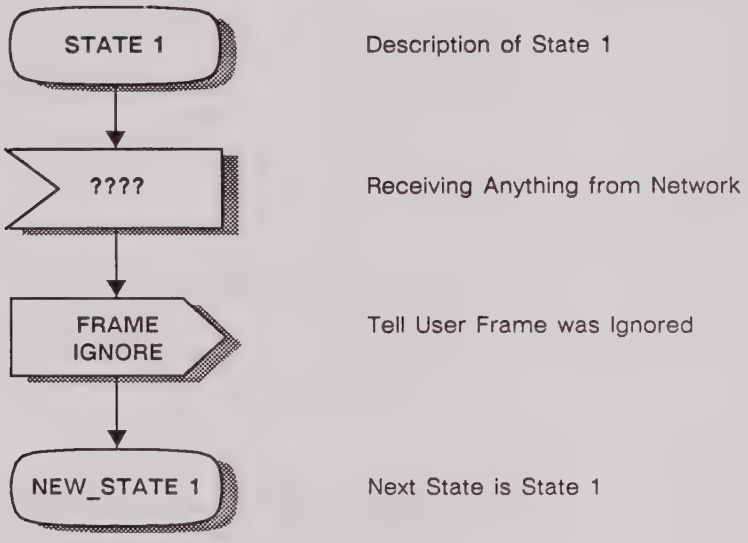


Figure 5-1

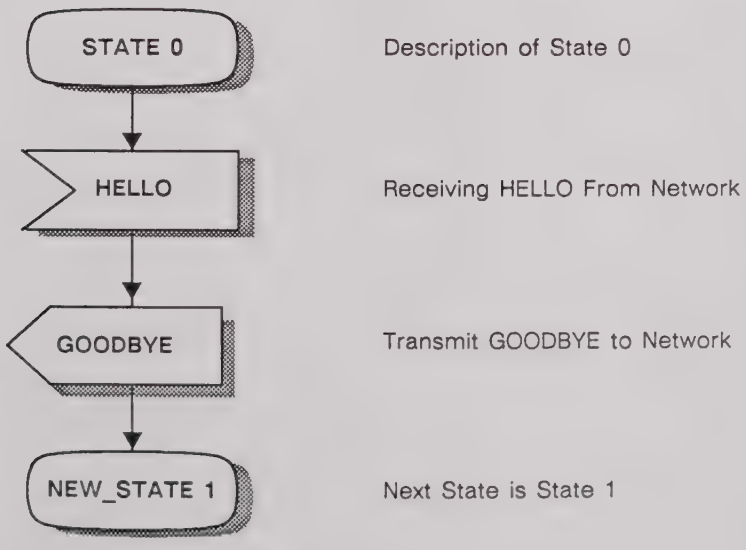


Figure 5-2

Example: These tests are supplied on your diskette as samples.

This state machine waits until it receives HELLO, then transmits GOODBYE. Once it has transmitted a GOODBYE, it will not respond to a HELLO.

In test manager state machine notation, this would be written as follows:

```
TCLR

0 STATE{
     " HELLO" ?RECEIVED
          ACTION{
                " GOODBYE" SEND
                1 NEW_STATE                    ( Goto state 1 )
          }ACTION
}STATE                                         ( End of state 0 )

1 STATE{
     " ??" ?RECEIVED
          ACTION{
                T." Frame ignored" TCR ( Message to user )
          }ACTION
}STATE                                         ( End of state 1 )
```

3.4.2 USM_TEST 2

A more interesting example is for the state machine to respond GOODBYE when it receives a HELLO and then have it wait until it receives a GOODBYE before it will respond to another HELLO.

The test manager notation is shown below:

```
TCLR

0 STATE{
     " HELLO" ?RECEIVED
          ACTION{
                " GOODBYE" SEND
                1 NEW_STATE                    ( Goto state 1 )
          }ACTION
}STATE                                         ( End of state 0 )

1 STATE{
     " GOODBYE" ?RECEIVED
          ACTION{
                0 NEW_STATE                    ( Ready to receive HELLO again )
          }ACTION
}STATE                                         ( End of state 1 )
```

3.4.3 USM_TEST 3

A more complicated example is to have the state machine wait for three seconds before responding to another HELLO.

```
TCLR

0 STATE{
     " HELLO" ?RECEIVED
          ACTION{
                " GOODBYE" SEND
                 1 NEW_STATE                    ( Goto state 1 )
          }ACTION
}STATE                                          ( End of state 0 )

1 STATE{
     " GOODBYE" ?RECEIVED
          ACTON{
                1 30 START_TIMER                ( Start timer 1 for 3 seconds )
                2 NEW_STATE                     ( Wait for timer )
          }ACTION
}STATE                                          ( End of state 1 )

2 STATE{
     1 ?TIMER
          ACTION{
                0 NEW_STATE                     ( Receive more HELLOs )
          }ACTION
}STATE                                          ( End of state 2 )
```

3.4.4 CONDITION JUDGEMENT EXAMPLE (USM_TEST 4)

Here is an example where the state machine will respond differently depending on the message. If it receives BONJOUR, it will respond AU REVOIR and expect an AU REVOIR. If it receives HELLO, it will respond GOODBYE and expect a GOODBYE. It will still wait for three seconds before responding again.

```
TCLR

0 STATE{
     " HELLO" ?RECEIVED
          ACTION{
                 " GOODBYE" SEND
                  1 NEW_STATE                    ( Goto state 1 )
          }ACTION
                  " BONJOUR" ?RECEIVED
          ACTION{
                 " AU REVOIR" SEND
                  2 NEW_STATE                    ( Goto state 2 )
          }ACTION
}STATE                                           ( End of state 0 )

1 STATE{
     " GOODBYE" ?RECEIVED
          ACTION{
                 1 30 START_TIMER                ( Start timer 1 for 3 seconds )
                 3 NEW_STATE                     ( Wait for timer )
          }ACTION
}STATE                                           ( End of state 1 )

2 STATE{
     " AU REVOIR" ?RECEIVED
          ACTION{
                 1 30 START_TIMER                ( Start timer 1 for 3 seconds )
                 3 NEW_STATE                     ( Wait for timer )
          }ACTION
}STATE                                           ( End of state 2 )

3 STATE{
     1 ?TIMER
          ACTION{
                 0 NEW_STATE                     ( Receive more HELLOs )
          }ACTION
}STATE                                           ( End of state 3 )
```

3.4.5 LEAD EXAMPLE (USM_TEST 5)

Here, the state machine is acting as a DCE. When the RTS lead turns on, the CTS lead is turned on and the CD lead off. When the RTS lead turns off, the CTS lead is turned off and the CD lead is turned on. When the CD lead is high, the state machine will transmit a frame every second.

```
TCLR

0 STATE{
     ?RTS_OFF
          ACTION{
                    CTS_OFF
                    CD_ON
                    1 10 START_TIMER
                    1 NEW_STATE
          }ACTION
}STATE

1 STATE{
     1 ?TIMER
          ACTION{
                    " HELLO WORLD" SEND
                    1 10 START_TIMER
          }ACTION
     ?RTS_ON
          ACTION{
                    CTS_ON
                    CD_OFF
                    0 NEW_STATE
          }ACTION
}STATE
```

3.4.6 COUNTER EXAMPLE (USM_TEST 6)

Here the RTS lead changes from off to on are counted. Every time 40 transitions are received, a buzzer is sounded and a statement displayed.

```
TCLR

0 STATE{
     ?RTS_ON
          ACTION{
                    1 COUNTER +!                    ( Increment counter )
                    COUNTER @ 40 =                  ( Test counter )
                    IF
                         0 COUNTER !                ( Reset counter )
                         BEEP
                         T." 40 RTS leads changes" TCR
                    ENDIF
          }ACTION
}STATE
```

3.4.7 USM_TEST 7

This is an example of the method used in sending a frame of more than 255 characters. The file labelled TEXT.T contains the desired string.

```
MONITOR
TCLR
     0 STATE_INIT
               " TEXT.T" DUP LOCATE_FILE
               IF
                    UF1 " SEND DATA " = TM_KEY
                    0 FILE ->BUFFER
                    1 NEW_STATE
               ELSE
                    DROP BEEP
                    T. "FILE: USM_TEXT Does Not Exist. " TCR TM_STOP
               THEN
     }STATE_INIT

     1 STATE{
          ?FK_1
          ACTION{
                    2 NEW_STATE
                    0 128 SENDB
          }ACTION
          " HELLO"? RECEIVED
          ACTION{
                    2 NEW_STATE
                    0 64 SENDB
               }ACTION
     }STATE

     2 STATE{
          ?FK_1
          ACTION{
                    3 NEW_STATE
                    0 256 SENDB
          }ACTION
          " HELLO"? RECEIVED
          ACTION{
                    3 NEW_STATE
                    0 256 SENDB
          }ACTION
     }STATE

     3 STATE{
          ?FK_1
          ACTION{
                    1 NEW_STATE
                    0 1024 SENDB
          }ACTION
          " HELLO"? RECEIVED
          ACTION{
                    1 NEW_STATE
```

```
                0 1024 SENDB
        }ACTION
    }STATE
```

3.4.8 EBCDIC BISYNC EXAMPLE (USM_BSC_E)

This is the same example as USM_TEST 2 only it is used in EBCDIC BISYNC.

```
TCLR

0 STATE{
     " HELLO" ?SEARCH
          ACTION{
                    "  SH 11 SX GOODBYE EX  " SEND
                    1 NEW_STATE
          }ACTION
}STATE

1 STATE{
     " HELLO" ?SEARCH
          ACTION{
                    0 NEW_STATE
          }ACTION
}STATE
```

4 APPLICABLE DOCUMENTS

This section contains a list of manuals and documents that have been referenced in the body of this manual, and may contain supplementary information for the use of the USM software package.

[1] K1197 MULTIFORTH User Manual. SIEMENS AG

[2] K1197 FORTH Programming User Manual. SIEMENS AG

[3] SDL : Specification and description language

CCITT Recommendation Z.101–104

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SIEMENS

Bestell-Nr. für Registersatz: 6ZB5900-0AL00-8AA1
907916 109210.

Bestell-Nr. für Registersatz: 6ZB5900-0AL00-8AA1
907916 109210

Bestell-Nr. für Registersatz: 6ZB5900-0AL00-8AA1
907916 109210.

Bestell-Nr. für Registersatz: 6ZB5900-0AL00-8AA1
907916 109210

Bestell-Nr. für Registersatz: 6ZB5900-0AL00-8AA1
907916 109210.

Bestell-Nr. für Registersatz: 6ZB5900-0AL00-8AA1
907916 109210.

NET 2
Conformance Tests

User Manual for
Protocol Tester K1197

SIEMENS AG

Software Version	:	V1.1
System Version	:	MF 2.2
Revision Date	:	May, 1991

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1. INTRODUCTION

This Software is an implementation of:

NET 2

First edition: 1988

TECHNICAL RECOMMENDATIONS
APPLICATION COMMITTEE

TRAC

EUROPEAN TELECOMMUNICATION STANDARD

Approval requirements for data terminal equipment to connect to packet switched public data networks using CCITT Recommendation X.25 (1984) interface

The test sequences are detailed in clause 9 – Link level requirements and clause 10 – Packet level requirements.

1.1 TEST SEQUENCE STRUCTURE

Each of the test cases described in NET 2 are preceded by an Initialisation sequence (IS) which confirms the IUT is in the desired state to perform the test sequence, but does not specify how that state is attained. Where confirmation of the IUT state is required following a test case sequence, a Verification sequence (VS) is specified. This implementation uses well defined preambles and postambles that allow a test sequence to be performed from the same initial state and to end in a known state, whether the case is run on its own or as part of a test suite or if an event causes the test case to terminate prematurely. The preamble allows the required state for test to be achieved prior to the Initialisation sequence – allowing the Initialisation sequences specified in the NET to be performed. The postamble attempts to disconnect or obtain confirmation of the disconnected state and will always be run following the normal or early termination of a test case.

1.2 VERDICTS

A verdict is attached after every event in the test sequence, that is, after each frame received from the IUT or a timeout event. The verdicts are attached in preambles, Initialisation sequences, test cases and Verification sequences but not in the postamble. If the entire test sequence is successful, the verdict will be shown on the screen (and log) trace following the postamble. If an INCONC or FAIL verdict is assigned to an event, this is shown at the appropriate point in the sequence on the screen (and log) trace Attachment of partial verdicts throughout the sequence of preamble, IS, test case and VS allows the progress to be checked and early termination to the postamble if required. For specific details on verdict attachments, refer to the separate sections on Layer 2 and Layer 3 tests.

1.3 REGULATORY MODE

A Regulatory parameter is available on the general parameter page. When this is set to YES, the test cases run will be those selected on the case selection menus (i.e regulatory mode forces the tester into restricted mode). In addition, an automatic initial test case selection will be made on the basis of the information contained in the PICS parameters. This process selects only those test cases that are relevant to the current implementation. Any test case not selected by this process will be locked and unavailable for selection. Test cases selected by this process can be manually deselected to allow partial suites or single test cases to be run in regulatory mode. The regulatory selection is indicated in Table 1 for Layer 2 and Table 3 for Layer 3.

IUT = Implementation under Test
Verdicts: Pass, Inconclusive, Fail (PASS, INCONC, FAIL)

1.4 PICS / PIXIT PARAMETERS

PICS and PIXIT parameters are provided for both link and packet layer tests. Their usage is described fully under the appropriate Layer 2 and Layer 3 descriptions.

The following more detailed notes are separated into Layer 2 and Layer 3 sections and are organised for each section as follows :

Description of PICS parameters

Table showing Regulatory mode test case selection from PICS parameters

Description of PIXIT parameters

Test case / PICS PIXIT cross reference table

Specific verdict attachment details

Non standard behavior of test cases

PICS = Protocol Implementation Conformance Statement (see ISO 9646)
PIXIT = Protocol Implementation Extra Information for Testing (see ISO 9646)

2. STARTING THE PROGRAM

After booting, select the drive where the 'NET2' files are located and select the X.25 EMULATION item in the menu.

When the X.25 EMULATION has been loaded successfully, enter the application by selecting the item or by pressing the ESC key.

After entering the application, be sure to have the right configuration. Select EMULATION SETUP in the main-menu and then INTERFACE SETUP. The configuration should be EMULATE: DCE=NETWORK and DIRECTION: TO_DTE_IF. The items INTERFACE, SPEED and CLOCK are user equipment dependent. After configurating the interface, save this configuration. It will configure the interface everytime starting the application.

In this mode, a connected device under test may be examined with the emulation functions.
Try to establish the layer 2 by sending a SABM frame just by typing SABM <RETURN>.
To disconnect the layer 2 type DISC <RETURN> and a DISC frame will be sent.
Both frames has to be answered by an UA frame.

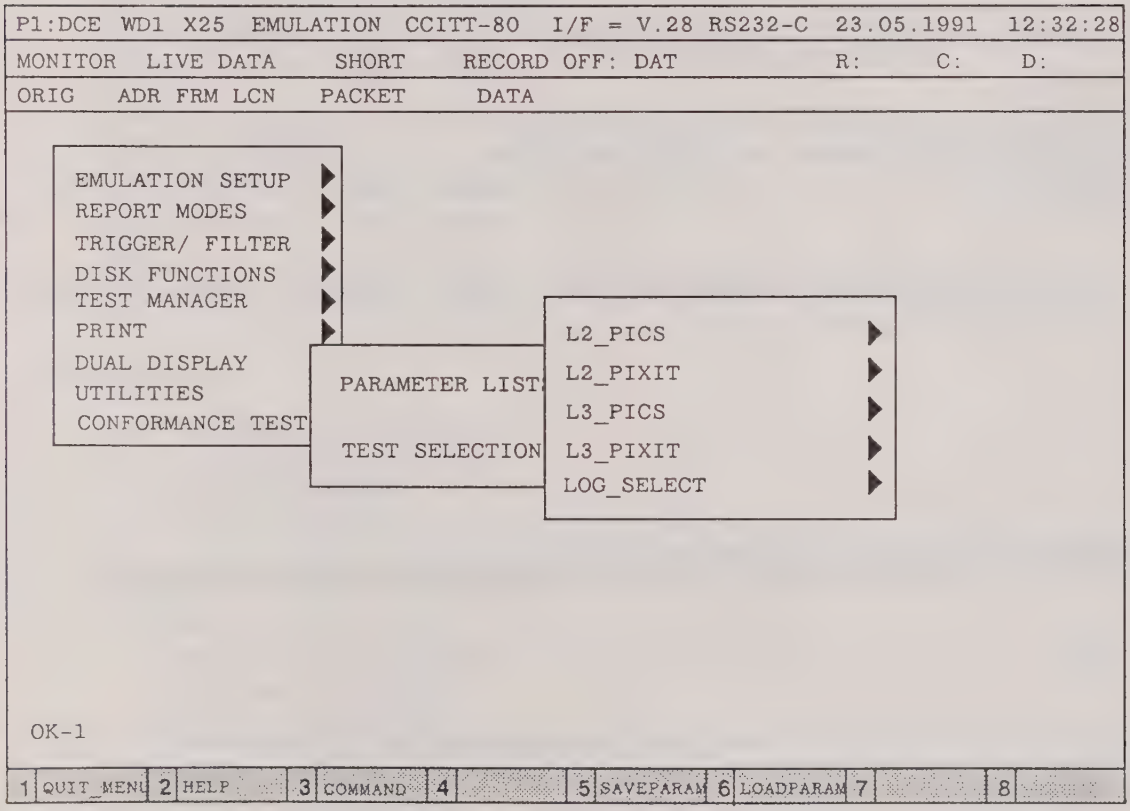
If the emulation can't receive an answer, check the interface settings and the connecting cable and repeat the establish procedure. If there is still no answer, switch off the K1197, check the connector-board and repeat the whole procedure from the beginning.

To execute the NET2 select the item CONFORMANCE TEST.

3. IMPLEMENTATION NOTES

3.1 IMPLEMENTATION OF NET2 LAYER 2

3.1.1 LAYER 2 – DESCRIPTION OF PICS PARAMETERS



This is the Parameter Lists menu

To save all PICS/PIXIT and LOG settings press function key F5 SAVEPARAM.

To load PICS/PIXIT and LOG settings press function key F6 LOADPARAM.

Layer 2 PICS parameters

```
P1:DCE WD1 X25 EMULATION CCITT-80 I/F = V.28 RS232-C 23.05.1991 12:32:28
MONITOR LIVE DATA SHORT RECORD OFF: DAT R: C: D:
ORIG ADR FRM LCN PACKET DATA

                                L2_PICS
( NET 2   LAYER 2 PICS                    DEVICE UNDER TEST = DTE  )
( ======================                   TESTER            = DCE  )
(  * LINK SET-UP METHODS SUPPORTED BY DTE * )

DCE-SABM-START                  :=      YES
DCE-SOLICITED-START             :=      YES
DTE-SABM-START                  :=      NO
DTE-DISC-START                  :=      NO

( ============================ End of PICS ============================ )

OK-1
1 QUIT_MENU 2 HELP 3 COMMAND 4 5 6 7 8
```

The above screen picture shows the Layer 2 PICS table as an example.

To select one of these items move the cursor with the cursor-keys.
To change its contents select the item by pressing the cursor-right-key or by pressing the return-key. Select the new value and press the return-key.

The following parameters are provided in the layer 2 PIC parameter menu :

DCE-SABM-START	default value = YES
DCE-SOLICITED-START	default value = YES
DTE-SABM-START	default value = NO
DTE-DISC-START	default value = NO

The parameters indicate to the tester which link setup capabilities are simultaneously supported by the IUT.

The parameters have two uses as follows :

1) When the value of the REGULATORY parameter is set to YES, test cases (primarily by subgroup) are automatically selected in accordance with Table 1.

2) In some instances , the behaviour of the IUT may differ from that specified by the NET due to several link setup methods being supported simultaneously. Where these conflicts occur , they are described in the section 'Non standard behaviour' under the appropriate test case heading.

Table 1 : Layer 2 - Regulatory mode test case selection from PICS parameters

PICS parameters

A .. DCE-SABM-START
B .. DCE-SOLICITED-START
C .. DTE-SABM-START
D .. DTE-DISC-START

* indicates subgroup selection if parameter is set to YES

Subgroup	PICS			
	A	B	C	D
9.1.1	*			
9.1.2		*		
9.1.3			*	
9.1.4				*
9.2.1			*	
9.2.2			*	
9.2.3				*
9.2.4				*

All cases in groups 9.3 to 9.11 are all initially selected.

In addition to the selection rules shown in the table, if neither of the PICS parameters DTE-SABM-START or DTE-DISC-START are set to YES then group 9.2 will be deselected and locked.

3.1.2 LAYER 2 - DESCRIPTION OF PIXIT PARAMETERS

The following parameters are provided in the layer 2 PIXIT parameter menu :

L2-IDLE-TIMER

Entered in seconds
Default value = 30
Minimum value = 5
Maximum value = 120

In a number of test cases , the tester provides an IUT operator message , requesting a specific frame. This parameter contains the time the tester will wait for the required frame.

DTE-T1-TIMER

Entered in tenths of seconds
Default value = 30
Minimum value = 5
Maximum value = 120

This parameter is used to indicate to the tester the duration of the IUT's X.25 T1 timer value.

DTE-N1-PARAMETER

Entered in number of bits
Default value = 1080
Minimum value = 40
Maximum value = 1798

This parameter is used to indicate to the tester the value of the IUT's X.25 N1 parameter.

DTE-N2-PARAMETER

Entered in number of transmission attempts
Default value = 10
Minimum value = 2
Maximum value = 100

This parameter is used to indicate to the tester the value of the IUT's X.25 N2 parameter.

DTE-K-PARAMETER

Entered in window size
Default value = 7
Minimum value = 2
Maximum value = 7

This parameter is used to indicate to the tester the value of the IUT's X.25 K parameter. Note - NET 2 requires a value of k = 7.

L2-MAX-RESPONSE-DELAY

Entered in tenths of seconds
Default value = 20
Minimum value = 5
Maximum value = 180

This parameter is used by the tester to set a timeout when waiting for a response from the IUT. This value should always be less than that value set in the DTE-T1-TIMER parameter.

DTE-STIMULATING-PACKET-TYPE

Two selectable values : 1) RESTART_INDICATION
2) USER_DEFINED

Default value = RESTART_INDICATION

Where the tester is required to send an INFORMATION frame in order to force the IUT to respond with an INFORMATION frame , this parameter sets the contents of the information field of the transmitted INFORMATION frame.

If 1) is selected then the information field will contain a layer 3 RESTART INDICATION packet with the following fields :

GFI = 0001
Restart cause field = 0
Diagnostic field = 0

If 2) is selected then the information field will contain the information entered in the PIXIT parameter USER-DEF-STIMULATING-PACKET. (See below)

USER-DEF-STIMULATING-PACKET

Entered as a HEX string of upto 80 characters
Default value = "1000FB0000"

This parameter is used when the parameter DTE-STIMULATING-PACKET-TYPE (See above) has been set to USER-DEFINED. The HEX string entered is used as the contents of the information field of the INFORMATION frame transmitted to the IUT in order to force the IUT to transmit an INFORMATION frame. The default string is equivalent to a layer 3 RESTART INDICATION packet.

TX_1st_I_FRAME_ON_LINK_SETUP

Two selectable values : 1) YES
2) NO

Default value = NO

This parameter is used to indicate to the tester if the IUT will send an INFORMATION frame after link setup. If the parameter is set to YES the tester will set a timeout equal to the value contained in the parameter L2-MAX-RESPONSE-DELAY and expect an INFORMATION frame, e.g. Restart.

TX_1st_I_FRAME_ON_LINK_RESET

Two selectable values : 1) YES
2) NO

Default value = NO

This parameter is used to indicate to the tester if the IUT will send an INFORMATION frame after a link reset procedure by the tester. This parameter is only relevant to test case 9.3.2. If the parameter is set to YES the tester will set a timeout equal to the value contained in the parameter L2-MAX-RESPONSE-DELAY and expect an information frame.

RESPONSE-PACKET-TYPE

Two selectable values : 1) RESTART_CONFIRMATION
2) USER_DEFINE

Default value = RESTART_CONFIRMATION

In certain test cases , the tester will wait for an INFORMATION frame on the basis of the values of the two previous parameters
(TX_1st_I_FRAME_ON_LINK_SETUP and TX_1st_I_FRAME_ON_LINK_RESET).

In some of these cases it is appropriate for the tester to respond at the packet level in order that the IUT does not enter a waiting state. In such cases , the packet layer response is determined by the value of this parameter.
If 1) is selected , the information field of the reponse INFORMATION frame will be a layer 3 RESTART CONFIRMATION packet. If 2) is selected the information field will contain the information entered in the parameter USER-DEF-RESPONSE-PACKET. (See below)

USER-DEF-RESPONSE-PACKET

Entered as a HEX string of upto 80 characters Default value = "1000FF"

This parameter is used to set the contents of the reponse INFORMATION frame when the value of the parameter RESPONSE-PACKET-TYPE (See above) has been set to USER_DEFINED. The default string is equivalent to a layer 3 RESTART CONFIRMATION packet.

Table 2. Test case / PICS PIXIT cross reference table

PICS parameters

A .. DCE-SABM-START
B .. DCE-SOLICITED-START
C .. DTE-SABM-START
D .. DTE-DISC-START

PIXIT parameters

E .. L2-IDLE-TIMER
F .. DTE-T1-TIMER
G .. DTE-N1-PARAMETER
H .. DTE-N2-PARAMETER
I .. DTE-K-PARAMETER
J .. L2-MAX-RESPONSE-DELAY
K .. DTE-STIMULATING-PACKET-TYPE
L .. USER-DEF-STIMULATING-PACKET
M .. TX_1st_I_FRAME_ON_LINK_SETUP
N .. TX_1st_I_FRAME_ON_LINK_RESET
O .. RESPONSE-PACKET-TYPE
P .. USER-DEF-RESPONSE-PACKET

Pr .. Preamble
IS .. Initialisation sequence
TC .. Test case
VS .. Verification sequence

* indicates that the parameter is used (or optionally used) by the sequence.

Group	Subgroup	Case		PICS				PIXIT											
				A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
9.1	9.1.1	9.1.1.1	Pr						*				*						
			IS										*						
			TC			*	*						*	*	*	*			
			VS										*						
9.1	9.1.1	9.1.1.2	Pr						*				*						
			IS										*						
			TC			*	*						*	*	*	*			
			VS										*						
9.1	9.1.2	9.1.2.1	Pr						*				*						
			IS										*						
			TC		*	*	*						*	*	*	*			
			VS										*						
9.1	9.1.2	9.1.2.2	Pr						*				*						
			IS										*						
			TC		*	*	*		*				*	*	*	*			
			VS										*						
9.1	9.1.3	9.1.3.1	Pr						*				*						
			IS										*						
			TC					*					*	*	*	*			
			VS										*						
9.1	9.1.3	9.1.3.2	Pr						*				*						
			IS										*						
			TC					*	*				*	*	*	*			
			VS										*						

Group	Subgroup	Case		PICS				PIXIT											
				A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
9.1	9.1.4	9.1.4.1	Pr						*				*						
			IS										*						
			TC					*					*	*	*	*			
			VS										*						
9.1	9.1.4	9.1.4.2	Pr						*				*						
			IS										*						
			TC					*	*				*	*	*	*			
			VS										*						
9.2	9.2.1	9.2.1.P1	Pr						*				*						
			IS										*						
			TC					*					*	*	*	*			
			VS										*						
9.2	9.2.1	9.2.1.P0	Pr						*				*						
			IS										*						
			TC					*					*	*	*	*			
			VS										*						
9.2	9.2.2	9.2.2.P1	Pr						*				*						
			IS										*						
			TC		*	*		*					*						
			VS										*						
9.2	9.2.2	9.2.2.P0	Pr						*				*						
			IS										*						
			TC		*	*		*					*						
			VS										*						
9.3		9.3.1	Pr						*				*			*		*	*
			IS										*						
			TC										*	*	*				
9.3		9.3.2	Pr						*				*			*		*	*
			IS										*						
			TC										*	*	*		*		
9.4		9.4.1	Pr						*				*			*		*	*
			IS										*						
			TC						*		*		*	*	*				
9.5		9.5.1	Pr					*					*			*		*	*
			IS										*						
			TC					*					*						
			VS										*						
9.5		9.5.2	Pr					*					*			*		*	*
			IS										*						
			TC					*					*	*	*				
			VS										*						
9.5		9.5.3	Pr					*					*			*		*	*
			IS										*						
			TC					*					*	*	*				
			VS										*						
9.5		9.5.4	Pr					*					*			*		*	*
			IS										*						
			TC					*	*				*	*	*				
			VS										*						

Group	Subgroup	Case		PICS				PIXIT											
				A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
9.6		9.6.1	Pr					*					*			*		*	*
			IS										*						
			TC					*					*	*	*				
			VS										*						
9.6		9.6.2	Pr					*					*			*		*	*
			IS										*						
			TC					*					*	*	*				
			VS										*						
9.7	9.7.1	9.7.1.F1	Pr						*				*			*		*	*
			IS										*						
			TC										*						
9.7	9.7.1	9.7.1.F0	Pr						*				*			*		*	*
			IS										*						
			TC										*						
9.7		9.7.2	Pr						*				*			*		*	*
			IS										*						
			TC										*						
9.7		9.7.3	Pr						*				*			*		*	*
			IS										*						
			TC										*						
9.8		9.8.1	Pr						*				*			*		*	*
			IS										*						
			TC										*	*	*				
9.8		9.8.2	Pr						*				*			*		*	*
			IS										*						
			TC										*	*	*				
9.8		9.8.3	Pr						*				*			*		*	*
			IS										*						
			TC										*	*	*				
9.9		9.9.1	Pr						*				*			*		*	*
			IS										*						
			TC						*			*	*	*	*				
9.9		9.9.2	Pr						*				*			*		*	*
			IS										*						
			TC										*	*	*				
9.10		9.10.1	Pr						*				*						
			IS										*						
			TC			*	*						*						
9.10		9.10.2	Pr						*				*						
			IS										*						
			TC			*	*						*						
9.10		9.10.3	Pr						*				*						
			IS										*						
			TC			*	*						*	*	*				

Group	Subgroup	Case		PICS					PIXIT											
				A	B	C	D		E	F	G	H	I	J	K	L	M	N	O	P
9.11		9.11.1	Pr IS TC							*				* * *			*		*	*
9.11		9.11.2	Pr IS TC VS			*	*			*				* * * *	*	*	*		*	*
9.11	9.11.3	9.11.3.F1	Pr IS TC							*				* * *			*		*	*
9.11	9.11.4	9.11.3.F0	Pr IS TC							*				* * *			*		*	*

3.1.3 LAYER 2 – SPECIFIC VERDICT ATTACHMENT DETAILS

A PASS verdict is assigned where the IUT has behaved as specified by the NET 2 link layer test case.

A PASS verdict is assigned where the IUT behaviour has included actions not specified in the NET 2 test case but is regarded as normal behaviour and is consistent with CCITT Recommendation X.25 (1984). All such cases are detailed in the section – Layer 2 – Non standard behaviour of test cases.

An INCONC verdict is assigned on the following events :

1) Where the first frame of a test case is expected from the IUT , an operator message is provided and the tester waits a time equal to the value entered in the Layer 2 PIXIT parameter L2-IDLE-TIMER. If a timeout occurs waiting for the specified frame an INCONC verdict is assigned and the test case proceeds to the postamble.

2) Where the Layer 2 PIXIT parameters TX_1st_I_FRAME_ON_LINK_SETUP and TX_1st_I_FRAME_ON_LINK_RESET indicate that the IUT will send an Information frame immediately following a link setup or link reset procedure by the tester , the tester will wait a time equal to the value entered in the Layer 2 PIXIT parameter L2-MAX-RESPONSE-DELAY. If a timeout occurs waiting for the Information frame , an INCONC verdict is assigned and the test case proceeds to the postamble.

3) Where the tester sends an Information frame in order to force the IUT to send an information frame , the contents of the tester's Information frame information field are determined by the Layer 2 PIXIT parameter DTE-STIMULATING-PACKET-TYPE." The tester waits a time equal to the value entered in the Layer 2 PIXIT parameter L2-MAX-RESPONSE-DELAY. If a timeout occurs waiting for the Information field from the IUT , an INCONC verdict is assigned and the test case proceeds to the postamble.

4) In the information transfer phase , a number of unexpected frames may be received that do not allow the test case to proceed but are valid in CCITT Recommendation X.25 (1984). These unexpected frames will cause an INCONC verdict to be assigned and are as follows :

SABM or DISC command
DM response
RNR command or response indicating IUT busy state

A FAIL verdict is assigned for all those events not described above.

The tester will detect :

1) An inappropriate frame

2) An expected frame with an incorrect poll/final bit and/or incorrect N(R) and N(S) sequence numbers where appropriate.

3) A timeout waiting for a response frame except for those timeouts described above under INCONC verdicts.

3.1.4 LAYER 2 - NON STANDARD BEHAVIOUR OF TEST CASES

This section details those events that are not specified in the NET that do not cause a FAIL verdict and have not been specified in the specific verdict attachment details.

9.1.1.1

In addition to the UA responses specified by the NET , an INCONC verdict is assigned if a SABM P=1 command is received and the PICS parameter DTE-SABM-START is set to YES or if a DISC P=1 command is received and the PICS parameter DTE-DISC-START is set to YES.

9.1.1.2

As 9.1.1.1.

9.1.2.1

If a SABM P=1 command is received and the PICS parameters DCE-SOLICITED-START and DTE-SABM-START are both set to YES , then an INCONC verdict is assigned since the SABM may have been sent as an IUT initiated SABM start and not as a solicited start that the test requires. An INCONC verdict is assigned if a DISC P=1 command is received and the PICS parameter DTE-DISC-START is set to YES.

9.1.2.2

As 9.1.2.1.

9.1.3.1

While waiting for the first frame (SABM P=1) from the IUT , the tester will discard and take no subsequent action on the receipt of DISC P=1 commands or DM F=0 unsolicited responses.

9.1.3.2

As 9.1.3.1.

9.1.4.1

While waiting for the first frame (DISC P=1) from the IUT , the tester will discard and take no subsequent action on the receipt of SABM P=1 commands or DM F=0 unsolicited responses.

9.1.4.2

As 9.1.4.1.

9.2.1.P0 , 9.2.1.P1

As 9.1.3.1

9.2.2.P0 , 9.2.2.P1

As 9.1.3.1

9.2.3.P0 , 9.2.3.P1

As 9.1.4.1

9.2.4.P0 , 9.2.4.P1

As 9.1.4.1

9.3.1

In each INFORMATION frame exchange the tester will respond correctly , (RR F=1 response) , if an INFORMATION frame is received with the poll bit set to 1.

9.3.2

As 9.3.1

9.4.1

As 9.3.1

9.9.1

As 9.3.1

9.9.2

Following transmission of the tester's first INFORMATION frame , the tester will accept and respond correctly to a polled RR command frame or a polled INFORMATION frame from the IUT.

9.10.1

In addition to the DM response specified in the NET , an INCONC verdict is assigned if a SABM P=1 command is received and the PICS parameter DTE-SABM-START is set to YES or a DISC P=1 command is recevied and the PICS parameter DTE-DISC-START is set to YES.

9.10.2 , 9.10.3

As 9.10.1

9.11.2

As 9.3.1

3.2 IMPLEMENTATION OF NET2 LAYER 3

3.2.1 LAYER 3 – DESCRIPTION OF PICS PARAMETERS

The following parameters are provided in the Layer 3 PICS parameter menu :

PVC's	default value = NO
INCOMING_SVC's	default value = NO
TWO_WAY_SVC's	default value = YES
OUTGOING_SVC's	default value = NO

The parameters indicate to the tester which types of virtual circuit are simultaneously supported by the IUT.

The parameters have two uses as follows :

1) When the value of the REGULATORY parameter is set to YES , test cases (by group) are automatically selected in accordance with Table 3.

2) In test group 10.7 , either the tester or IUT can initiate the call on a logical channel. The tester will determine from the PICS parameters whether the IUT can accept incoming calls and if so will initiate the calls for this test group.

Table 3 . Layer 3 – Regulatory mode test case selection from PICS parameters

PICS parameters

A .. PVC's
B .. INCOMING_SVC's
C .. TWO_WAY_SVC's
D .. OUTGOING_SVC's

* indicates group selection if parameter is set to YES

Subgroup	PICS			
	A	B	C	D
10.1	*	*	*	*
10.2	*	*	*	*
10.3	*	*	*	*
10.4		*	*	*
10.5		*	*	
10.6			*	*
10.7		*	*	*
10.8			*	

From the table it can be seen that a given test group can be selected if more than one of the parameters are selected i.e group 10.5 can be selected if either parameter B , C or both are selected. Since the tester has to allocate a logical channel number for test purposes from the channel assignments given in the Layer 3 PIXIT , this allocation will depend on which types of logical channel are simultaneously supported and an order of priority exists where more than one PICS parameter is set to YES. This order of priority is shown in Table 4.

Table 4. Tester logical channel assignment algorithm

Test Group	Logical channel number used for test purposes (values from Layer 3 PIXIT logical channel assignments)
10.1 and 10.2	LOWEST-INCOMING-SVC or LOWEST-TWO-WAY-SVC or LOWEST-OUTGOING-SVC or LOWEST-PVC
10.3	ANY-UNASSIGNED-CHANNEL
10.4	LOWEST-INCOMING-SVC or LOWEST-TWO-WAY-SVC or LOWEST-OUTGOING-SVC
10.5	LOWEST-INCOMING-SVC or LOWEST-TWO-WAY-SVC
10.6	HIGHEST-INCOMING-SVC or HIGHEST-TWO-WAY-SVC
10.7	If neither INCOMING-SVC's nor TWO-WAY-SVC's is selected in the Layer 3 PICS: LOWEST-INCOMING-SVC or LOWEST-TWO-WAY-SVC Otherwise: HIGHEST-OUTGOING-SVC
10.8	HIGHEST-TWO-WAY-SVC

3.2.2 LAYER 3 - DESCRIPTION OF PIXIT PARAMETERS

The following parameters are provided in the Layer 3 PIXIT parameter menu :

L3-IDLE-TIMER

Entered in seconds
Default value = 30
Minimum value = 5
Maximum value = 120

In a number of test cases , the tester provides an IUT operator message , requesting a specific packet. This parameter contains the time the tester will wait for the required packet.

L3-MAX-RESPONSE-DELAY

Entered in tenths of seconds
Default value = 40
Minimum value = 5
Maximum value = 600

This parameter is used by the tester to set a timeout when waiting for a response from the IUT.

DTE-ADDRESS

Entered as a string of up to 15 characters
Default value = "1234567890"

This parameter is used to set the called address field in incoming call packets.

Logical channel assignment parameters :

LOWEST-PVC	All entered as integers
HIGHEST-PVC	Default value = 0
LOWEST-INCOMING-SVC	Minimum value = 0
HIGHEST-INCOMING-SVC	Maximum value = 4095
LOWEST-TWO-WAY-SVC	
HIGHEST-TWO-WAY-SVC	
LOWEST-OUTGOING-SVC	
HIGHEST-OUTGOING-SVC	
ANY-UNASSIGNED-SVC	

These parameters indicate the logical channel assignments for the IUT. A value of zero indicates no assignment.

PACKET-NUMBERING

Two selectable values : 1) MODULO_8
2) MODULO_128

Default value = MODULO_8

This parameter sets the value of the GFI to either 1 or 2 depending on the packet sequence numbering requirements of the IUT. Additional modification of the GFI field is performed by test cases that require the D bit to be set.

RESTART-IND-CAUSE
RESTART-IND-DIAG

Entered as integers
Default value = 0
Minimum value = 0
Maximum value = 127

These parameters allow any value of cause and diagnostic fields in the RESTART INDICATION packets sent by the tester.

CLEAR-IND-CAUSE
CLEAR-DIAG-CAUSE

Entered as integers
Default value = 0
Minimum value = 0
Maximum value = 255

These parameters allow any value of cause and diagnostic fields in the CLEAR INDICATION packets sent by the tester.

INCOMING-CALL-CUD

Entered as a string of up to 32 characters
Default value = "KTL-SIEMENS_OK"

This parameter is used to set the Call User Data field of the of the INCOMING CALL packet in test case 10.5.4 only.

DATA-PACKET-1
DATA-PACKET-2

Entered as strings of up to 80 characters
Default values = "KTL-SIEMENS_OK"

These parameters set the user data field of the data packets sent in the verification sequence of group 10.6 and test case 10.8.4.

10.7-CLEAR-INITIATE-METHOD

Two selectable values :
1) PACKET-FROM-TESTER
2) DTE-OPERATOR-INTERVENTION

Default value = PACKET-FROM-TESTER

This parameter is used to indicate to the tester how a CLEAR REQUEST packet is obtained from the IUT for test cases 10.7.2 to 10.7.5.
If 1) is selected, the specified test cases will send that packet set in the parameter 10.7-PACKET-FROM-TESTER in order to send a CLEAR REQUEST packet.
If 2) is selected , the tester will not send a packet and will indicate to the operator that the IUT should send a CLEAR REQUEST packet.

10.7-PACKET-FROM-TESTER

Three selectable values :
1) CLEAR_CONFIRMATION
2) INCOMING_CALL
3) CALL_CONNECTED

Default value = CLEAR_CONFIRMATION

When the parameter 10.7-CLEAR-INITIATE-METHOD (see above) is set to PACKET-FROM-TESTER , the packet sent in test cases 10.7.2 to 10.7.5 is that packet indicated by the value of this parameter.

Table 5 . Layer 3 Test case / PICS PIXIT cross reference table

PICS parameters

A .. PVC's
B .. INCOMING-SVC's
C .. TWO-WAY-SVC's
D .. OUTGOING-SVC's

PIXIT parameters

1 .. Layer 2 PIXIT parameter DTE-T1-TIMER
E .. L3-IDLE-TIMER
F .. L3-MAX-RESPONSE-DELAY
G .. DTE-ADDRESS
H .. LOWEST-PVC
I .. HIGHEST-PVC
J .. LOWEST-INCOMING-SVC
K .. HIGHEST-INCOMING-SVC
L .. LOWEST-TWO-WAY-SVC
M .. HIGHEST-TWO-WAY-SVC
N .. LOWEST-OUTGOING-SVC
O .. HIGHEST-OUTGOING-SVC
P .. ANY-UNASSIGNED-CHANNEL
Q .. PACKET-NUMBERING
R .. RESTART-IND-CAUSE
S .. RESTART-IND-DIAG
T .. CLEAR-IND-CAUSE
U .. CLEAR-IND-DIAG
V .. INCOMING-CALL-CUD
W .. DATA-PACKET-1
X .. DATA-PACKET-2
Y .. 10.7-CLEAR-INITIATE-METHOD
Z .. 10.7-PACKET-FROM-TESTER

Pr .. Preamble
IS .. Initialisation sequence
TC .. Test case
VS .. Verification sequence

* indicates that the parameter is used (or optionally used) by the sequence.

		PICS				PIXIT																				
Case		A	B	C	D	1	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	P
10.1.1	Pr																											
	IS							*											*	*	*							
	TC							*											*	*	*							
	VS							*											*	*	*							
10.1.2 & 10.1.3	Pr																											
	IS							*											*	*	*							
	TC							*											*									
	VS							*											*	*	*							

		PICS				PIXIT																						
Case		A	B	C	D	1	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	P
10.2.1	Pr																											
	IS							*											*	*	*							
	TC					*		*		*		*		*		*			*			*	*					
	VS							*											*	*	*							
10.2.2 10.2.4 & 10.2.5	Pr																											
	IS							*											*	*	*							
	TC					*		*		*		*		*		*			*									
	VS							*											*	*	*							
10.2.3	Pr																											
	IS							*											*	*	*							
	TC					*		*	*	*		*		*		*			*									
	VS							*											*	*	*							
10.2.6	Pr																											
	IS							*											*	*	*							
	TC					*		*											*									
	VS							*											*	*	*							
10.3.1	Pr																											
	IS							*											*	*	*							
	TC					*		*	*									*	*									
	VS							*											*	*	*							
10.3.2	Pr																											
	IS							*											*	*	*							
	TC					*		*										*	*			*	*					
	VS							*											*	*	*							
10.4.1 & 10.4.3	Pr							*											*	*	*							
	IS							*				*		*		*			*			*	*					
	TC							*				*		*		*			*			*	*					
	VS							*				*		*		*			*			*	*					
10.4.2	Pr							*											*	*	*							
	IS							*				*		*		*			*			*	*					
	TC							*				*		*		*			*									
	VS							*				*		*		*			*			*	*					
10.4.4	Pr							*											*	*	*							
	IS							*				*		*		*			*			*	*					
	TC							-				*		*		*			*									
	VS							*				*		*		*			*			*	*					

		PICS				PIXIT																					
Case		A	B	C	D	1	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	P
10.5.1 10.5.2 10.5.3	Pr							*											*	*	*							
	IS							*				*		*					*			*	*					
	TC							*	*			*		*					*									
10.5.4	Pr							*											*	*	*							
	IS							*				*		*					*			*	*					
	TC							*	*			*		*					*					*				
10.6.1 10.6.2 10.6.3 10.6.4	Pr																											
	IS							*											*	*	*							
	TC						*	*							*		*		*									
	VS							*							*		*		*					*	*			
10.6.5	Pr																											
	IS							*											*	*	*							
	TC						*	*							*		*		*			*	*					
10.6.6	Pr																											
	IS							*											*	*	*							
	TC						*	*							*		*		*	*	*							
10.6.7 & 10.6.8	Pr																											
	IS							*											*	*	*							
	TC						*	*							*		*		*									
10.7.1	Pr							*											*	*	*							
	IS		*	*			*	*	*			*		*			*		*									
	TC							*				*		*			*		*			*	*					
	VS		*	*			*	*	*			*		*			*		*									
10.7.2	Pr							*											*	*	*							
	IS		*	*			*	*	*			*		*			*		*									
	TC							*				*		*			*		*								*	*
	VS		*	*			*	*				*		*			*		*									
10.7.3	Pr							*											*	*	*							
	IS		*	*			*	*	*			*		*			*		*									
	TC							*				*		*			*		*			*	*				*	*
	VS		*	*			*	*	*			*		*			*		*									
10.7.4	Pr							*											*	*	*							
	IS		*	*			*	*	*			*		*			*		*									
	TC							*				*		*			*		*									
	VS		*	*			*	*	*			*		*			*		*	*	*						*	*

Case		PICS				PIXIT																					
		A	B	C	D	1	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	P
10.7.5	Pr							*											*	*	*							
	IS		*	*			*	*	*			*		*			*		*									
	TC					*		*	*			*		*			*		*								*	*
	VS		*	*			*	*	*			*		*			*		*									
10.8.1	Pr							*											*	*	*							
	IS						*	*	*						*				*									
	TC							*							*				*			*	*					
10.8.2	Pr							*											*	*	*							
	IS						*	*	*						*				*									
	TC							*							*				*	*	*							
10.8.3	Pr							*											*	*	*							
	IS						*	*	*						*				*									
	TC							*							*				*									
10.8.4	Pr							*											*	*	*							
	IS						*	*	*						*				*									
	TC							*							*				*						*	*		

3.2.3 LAYER 3 - SPECIFIC VERDICT ATTACHMENT DETAILS

A PASS verdict is assigned where the IUT has behaved as specified by the NET 2 packet layer test case.

An INCONC verdict is assigned on the following events :

1) Where the first packet of a test case is expected from the IUT , an operator message is provided and the tester waits a time equal to the value entered in the Layer 3 PIXIT parameter L3-IDLE-TIMER. If a timeout occurs waiting for the specified packet , an INCONC verdict is asigned and the test case proceeds to the postamble.

2) If , for a specific test case , the tester is unable to find an appropriate logical channel assignment in the Layer 3 PIXIT parameters , an INCONC verdict is assigned and the test case proceeds to the postamble.

3) A number of unexpected packets may be received on the logical channel under test that do not allow the test case to proceed but are valid in CCITT Recommendation X.25 (1984). These unexpected packets will cause an INCONC verdict to be assigned and are as follows :

RESTART REQUEST
CLEAR REQUEST
RESET REQUEST

A FAIL verdict is assigned for all other events not described above.

The tester will detect :

1) An inappropriate packet

2) A timeout waiting for a response packet , except for the timeout described above under INCONC verdicts.

3.2.4 LAYER 3 – NON STANDARD BEHAVIOUR OF TEST CASES

The layer 3 test cases follow the test sequences shown in the NET and also process certain packets, assigning an INCONC verdict, as described in the section : Layer 3 – Specific verdict attachment details. In addition , the tester will discard and take no subsequent action on the receipt of packets on logical channels other than the logical channel under test. For example , with a test being performed on a logical channel assigned as an one way incoming SVC , data packets on a PVC will be discarded by the tester and not effect the outcome of the test. These packets will appear on the screen (and log) trace accompanied by a trace message in the form :

[TRACE] < Packet on LCN 1234 – discarded >

3.3 TEST SUITES, GROUPS, SUBGROUPS, CASES

SUITE_L2 : NET2 LAYER 2

9.1 LINK SET-UP TEST GROUP
- 9.1.1 DCE INITIATED START GROUP
  - 9.1.1.1 DCE INITIATED START , SABM P=0
  - 9.1.1.2 DCE INITIATED START , SABM P=1
- 9.1.2 DCE SOLICITED START GROUP
  - 9.1.2.1 DCE SOLICITED START
  - 9.1.2.2 DCE SOLICITED START , DTE RETRY AFTER T1
- 9.1.3 DTE INITIATED SABM START GROUP
  - 9.1.3.1 DTE SABM START
  - 9.1.3.2 DTE SABM START , DTE RETRY AFTER T1
- 9.1.4 DTE INITIATED DISC START GROUP
  - 9.1.4.1 DTE DISC START
  - 9.1.4.2 DTE DISC START , DTE RETRY AFTER T1

9.2 U-COMMAND COLLISION TEST GROUP
- 9.2.1 DCE SABM / DTE SABM COLLISION GROUP
  - 9.2.1.P1 SABM / SABM COLLISION , DCE SABM P=1
  - 9.2.1.P0 SABM / SABM COLLISION , DCE SABM P=0
- 9.2.2 DCE DISC / DTE SABM COLLISION GROUP
  - 9.2.2.P1 DISC / SABM COLLISION , DCE DISC P=1
  - 9.2.2.P0 DISC / SABM COLLISION , DCE DISC P=0
- 9.2.3 DCE SABM / DTE DISC COLLISION GROUP
  - 9.2.3.P1 SABM / DISC COLLISION , DCE SABM P=1
  - 9.2.3.P0 SABM / DISC COLLISION , DCE SABM P=0
- 9.2.4 DCE DISC / DTE DISC COLLISION GROUP
  - 9.2.4.P1 DISC / DISC COLLISION , DCE DISC P=1
  - 9.2.4.P0 DISC / DISC COLLISION , DCE DISC P=0

9.3 WINDOW ROTATION TEST GROUP
- 9.3.1 WINDOW ROTATION
- 9.3.2 WINDOW ROTATION WITH LINK RESET

9.4 N2 AND T1 TEST GROUP
- 9.4.1 N2 AND T1

9.5 INCORRECT FCS TEST GROUP
- 9.5.1 SABM/P=1 , INCORRECT FCS
- 9.5.2 I FRAME , INCORRECT FCS AND N(R)
- 9.5.3 I FRAME , INCORRECT FCS AND N(S)
- 9.5.4 I FRAME , INCORRECT FCS AND LONG FRAME

9.6 FRAME ABORT TEST GROUP
- 9.6.1 I FRAME , INCORRECT N(R) AND ABORTED
- 9.6.2 I FRAME , INCORRECT N(S) AND ABORTED

9.7 LINK RESET TEST GROUP
- 9.7.1 UNSOLICITED UA LINK RESET GROUP
  - 9.7.1.F1 UNSOLICITED UA , UA F=1
  - 9.7.1.F0 UNSOLICITED UA , UA F=0
- 9.7.2 UNSOLICITED RR , RR F=1
- 9.7.3 UNSOLICITED DM , DM F=1

9.8 REJECT PROCEDURE TEST GROUP
- 9.8.1 I FRAME / P=0 , INCORRECT N(S)
- 9.8.2 I FRAME / P=1 , INCORRECT N(S)
- 9.8.3 DCE SENDS REJECT

9.9 FLOW CONTROL TEST GROUP
- 9.9.1 WINDOW FLOW CONTROL
- 9.9.2 RNR FLOW CONTROL

9.10 DISCONNECTED PHASE TEST GROUP
- 9.10.1 DCE RR/P=1
- 9.10.2 DCE DISC/P=1
- 9.10.3 DCE I FRAME/P=1

9.11 MISCELLANEOUS TEST GROUP
- 9.11.1 POLLED RR FRAME
- 9.11.2 DM FRAME IN INFORMATION TRANSFER
- 9.11.3 RESPONSE TO FRMR GROUP
  - 9.11.3.F1 FRMR / F=1
  - 9.11.3.F0 FRMR / F=0

SUITE_L3 : NET2 LAYER 3

10.1 RESTART TEST GROUP
- 10.1.1 RESTART INDICATION IN R1
- 10.1.2 RESTART CONFIRMATION IN R2
- 10.1.3 RESTART INDICATION IN R2

10.2 STATE R2 TEST GROUP
- 10.2.1 CLEAR INDICATION IN R2
- 10.2.2 CLEAR CONFIRMATION IN R2
- 10.2.3 INCOMING CALL IN R2
- 10.2.4 CALL CONNECTED IN R2
- 10.2.5 PTI = 83 HEX IN R2
- 10.2.6 RESTART CONFIRMATION , GFI = 3 IN R2

10.3 UNASSIGNED LC's TEST GROUP
- 10.3.1 INCOMING CALL ON UNASSINGED LC
- 10.3.2 CLEAR INDICATION ON UNASSIGNED LC

10.4 STATE P1 TEST GROUP
- 10.4.1 CLEAR INDICATION IN P1
- 10.4.2 CALL CONNECTED IN P1
- 10.4.3 CLEAR CONFIRMATION IN P1
- 10.4.4 PTI = 83 HEX IN P1

10.5 INCOMING CALL TEST GROUP
- 10.5.1 CALLING ADDRESS LENGTH = 6
- 10.5.2 CALLING ADD. LENGTH = 15 , FIRST DIGIT = 0
- 10.5.3 D BIT = 1
- 10.5.4 WITH CALL USER DATA

10.6 CALL REQUEST TEST GROUP
- 10.6.1 CALLED ADDRESS LENGTH = 7
- 10.6.2 CALLED ADDRESS LENGTH = 6
- 10.6.3 CALLED ADDRESS LENGTH = 15 , FIRST DIGIT = 0
- 10.6.4 TESTER SETS D BIT = 1
- 10.6.5 TESTER SENDS CLEAP INDICATION
- 10.6.6 TESTER SENDS RESTART INDICATION
- 10.6.7 TESTER SENDS CLEAR CONFIRMATION
- 10.6.8 TESTER SENDS PACKET , PTI = 83 HEX

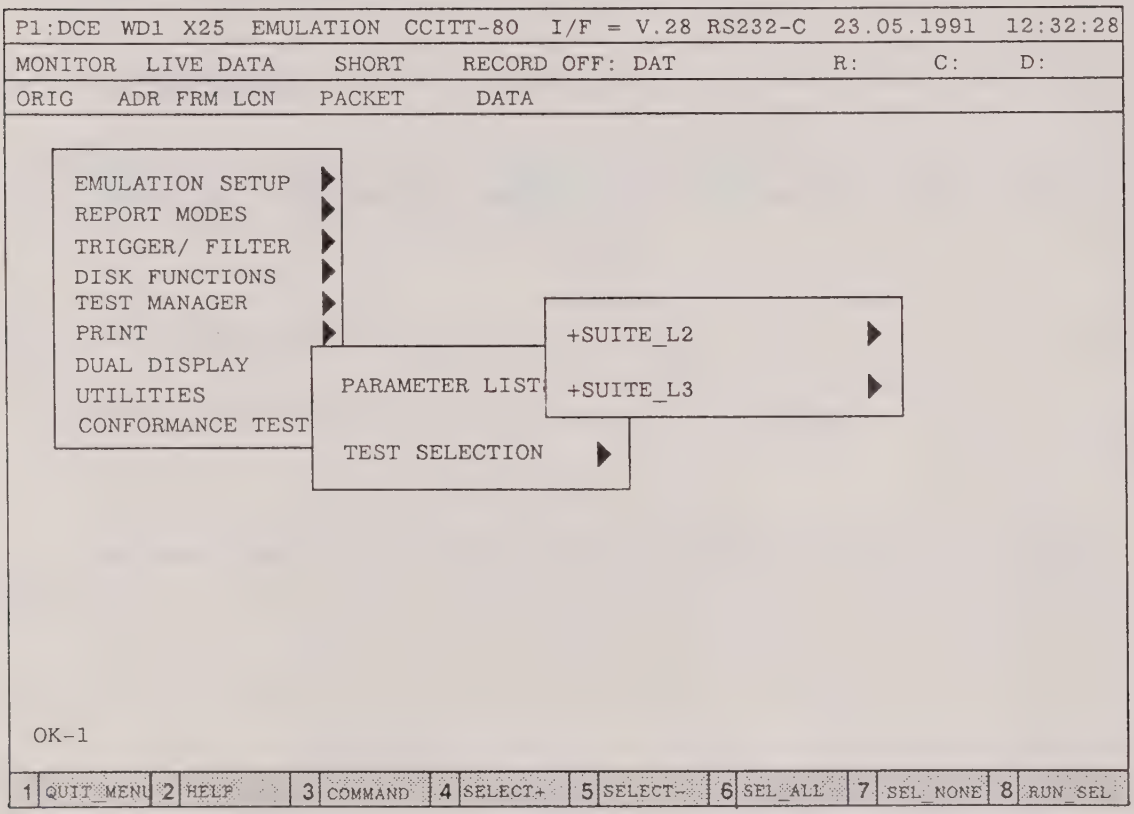
10.7 CALL CLEARING TEST GROUP
- 10.7.1 CLEAR INDICATION
- 10.7.2 CLEAR CONFIRMATION IN p6
- 10.7.3 CLEAR INDICATION IN p6
- 10.7.4 RESTART INDICATION IN p6
- 10.7.5 INCOMING CALL IN p6

10.8 CALL COLLISION TEST GROUP
- 10.8.1 CLEAR INDICATION
- 10.8.2 RESTART INDICATION
- 10.8.3 PACKET , PTI = 83 HEX
- 10.8.4 CALL CONNECTED + DATA

The numbers shown here are the respective NET2 chapter numbers

4. SIMPLE SAMPLE SESSION

Boot your K1197 system from winchester or from floppy-disks.
Press the function F1 'CONTINUE' when asked for.
Load the NET2-Software on the V/X-Interface by selecting the X.25 EMULATION item.
Enter the application, make changes to the default settings of the PICS/PIXITS if necessary and select your tests by entering the item TEST SELECTION.



Select your item. Move the cursor right to go to the group selection menu. The selectable levels are SUITE, GROUP, SUBGROUP and CASE. For example, when you press the function key F8 here when SUITE_L2 is selected, all the groups, subgroups and cases defined as SUITE_L2 would run.

Select the item by pressing function key F4 SELECT+.

Unselect the item by pressing function key F5 SELECT-.

Select all items shown in the actual menu by pressing function key F6 SEL_ALL.

Unselect all items shown in the actual menu by pressing function key F7 SEL_NONE.

Run the selected items from the actual menu and from the menues following by pressing function key F8 RUN_SEL.

5. FILES ON THE NET2 DISKETTE

5.1 X25_TP.Bx*

That is the binary form of X.25 EMULATION.

It is loaded via the X.25 EMULATION menu item, and it loads the X25_TP.BxX* file.

5.2 X25_TP.BxX*

This file contains the SIETEM and the NET2 test cases in binary form.
It will reside on the CPU dependent RAM extension, that is CPU2 when X.25 is running on CPU1 or CPU4 when X.25 is running on CPU3.

5.3 SIETEM_HLP.TXT

This file contains the SIETEM help window.

* the small letter x stands for either 1 if X.25 is running on Interface 1 or 3 if X.25 is running on Interface 2.

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